

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

In The Matter Of:  
The Montrose Chemical Superfund Site, and  
The Del Amo Superfund Site  
Los Angeles, California  
Groundwater Operable Unit

Montrose Chemical Corporation  
of California, Inc.,  
and Shell Oil Company,

Respondents.

Proceeding Under Section 106(a) of the  
Comprehensive Environmental Response,  
Compensation, and Liability Act of 1980;  
as amended (42 U.S.C. §9606(a))

U.S. EPA Docket No. 2008-04A

AMENDED ADMINISTRATIVE ORDER  
FOR REMEDIAL DESIGN WORK  
DUAL SITE GROUNDWATER OPERABLE  
UNIT

## Table of Contents

1		
2	I.	INTRODUCTION AND JURISDICTION..... 1
3	II.	FINDINGS OF FACT..... 4
4	III.	CONCLUSIONS OF LAW AND DETERMINATIONS ..... 8
5	IV.	NOTICE TO THE STATE ..... 9
6	V.	ORDER..... 9
7	VI.	DEFINITIONS..... 10
8	VII.	NOTICE OF INTENT TO COMPLY ..... 12
9	VIII.	PARTIES BOUND ..... 12
10	IX.	WORK TO BE PERFORMED ..... 13
11	X.	FAILURE TO ATTAIN PERFORMANCE STANDARDS ..... 16
12	XI.	ENDANGERMENT AND EMERGENCY RESPONSE..... 16
13	XII.	EPA REVIEW OF SUBMISSIONS ..... 17
14	XIII.	PROGRESS REPORTS..... 18
15	XIV.	QUALITY ASSURANCE, SAMPLING AND DATA ANALYSIS ..... 19
16	XV.	COMPLIANCE WITH APPLICABLE LAWS..... 21
17	XVI.	REMEDIAL PROJECT MANAGER..... 21
18	XVII.	ACCESS TO PROPERTY NOT OWNED BY RESPONDENT ..... 22
19	XVIII.	ACCESS AND DATA/DOCUMENT AVAILABILITY..... 23
20	XIX.	DELAY IN PERFORMANCE ..... 25
21	XX.	MODIFICATIONS ..... 26
22	XXI.	ASSURANCE OF ABILITY TO PERFORM WORK..... 27
23	XXII.	EPA NOT LIABLE ..... 27
24	XXIII.	ENFORCEMENT AND RESERVATIONS ..... 28
25	XXIV.	DOCUMENT SUBMISSIONS ..... 29
26	XXV.	OPPORTUNITY TO CONFER..... 29
27	XXVI.	REIMBURSEMENT OF OVERSIGHT COSTS ..... 30
28	XXVII.	EFFECTIVE DATE AND COMPUTATION OF TIME ..... 31

1                    AMENDED ADMINISTRATIVE ORDER FOR REMEDIAL DESIGN WORK  
2                    DUAL SITE GROUNDWATER OPERABLE UNIT

3  
4                    I.            INTRODUCTION AND JURISDICTION

5            A.        This Amended Administrative Order ("Order") directs Montrose Chemical  
6 Company of California, Inc. ("Respondent Montrose") and Shell Oil Company ("Respondent  
7 Shell"), collectively, "Respondents," to perform remedial design work for the remedy set forth in  
8 the Record of Decision for Dual Site Groundwater Operable Unit, Montrose Chemical and Del  
9 Amo Superfund Sites (March 1999) ("Record of Decision" or "ROD"). This Order is issued to  
10 the Respondents by the United States Environmental Protection Agency ("EPA") under the  
11 authority vested in the President of the United States by section 106(a) of the Comprehensive  
12 Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"),  
13 42 U.S.C. §9606(a). This authority was delegated to the Administrator of EPA on January 23,  
14 1987, by Executive Order 12580, 52 Fed. Reg. 2923, January 29, 1987. This authority was  
15 further delegated to EPA Regional Administrators on September 13, 1987 by EPA Delegation  
16 No. 1414B, and was further delegated to the respective Superfund Branch Chief, by the  
17 corresponding Region IX delegation dated November 6, 2001. EPA initially issued  
18 Administrative Order No. 2008-04 on February 20, 2008. Following a conference with the  
19 Respondents on March 12, 2008, EPA is amending the original order and Statement of Work,  
20 primarily to make certain modifications to the Remedial Design Work.

21            B.        EPA has informed the Respondents that EPA has determined that issuance of a  
22 unilateral administrative order for groundwater remedial design work is appropriate in order to  
23 properly document and manage the division of work between EPA and the Respondents.  
24 However, issuance of this Order and prior Orders for groundwater remedial design work shall  
25 not be construed as limiting or in any way narrowing the rights of the United States to pursue the  
26 Respondents for response costs related to or to compel the performance of groundwater design or  
27 remedial action at the Dual Site Groundwater Operable Unit.  
28

1 C. EPA Order No. 2003-06, issued to Respondent Montrose on May 8, 2003,  
2 required that Respondent Montrose perform "Initial Remedial Design Work" for the Dual Site  
3 Groundwater Operable Unit. Order 2003-06 was amended by EPA on January 24, 2004. EPA  
4 Order No. 2003-08, issued to Respondent Shell (and GSA) on September 3, 2003 required that  
5 Respondent Shell perform "Initial Remedial Design Work" for the Dual Site Groundwater  
6 Operable Unit. The Initial Remedial Design Work required under these previous orders was  
7 intended to support a unified remedial design for the Dual Site Groundwater Operable Unit.  
8 EPA Orders No. 2003-06 as amended, and 2003-08 remain fully in effect and enforceable.

9 D. This Order proceeds from the two previous EPA administrative orders discussed  
10 in Paragraph C, above, which remain fully in effect. This Order expands the scope of the Initial  
11 Remedial Design as to reflect the work required to complete the full remedial design for the Dual  
12 Site Groundwater Operable Unit (hereinafter, "Remedial Design Work" or "Work"). The scope  
13 of this Work is put forth in the Amended Statement of Work ("SOW") included as Attachment 1  
14 to this Order, which is incorporated by reference into this Order and is an enforceable part of this  
15 Order.

16 E. This Order is issued to the Respondents in their individual capacities, and Work is  
17 assigned to each Respondent in accordance with the attached SOW. As put forth in the  
18 Statement of Work, the Respondents shall coordinate the Work such that their response to this  
19 Order results in an operationally unified remedial design for the Dual Site Groundwater Operable  
20 Unit that meets all requirements of the Record of Decision which selected remedial actions for  
21 the Dual Site Groundwater Operable Unit, and all applicable statutory and regulatory  
22 requirements, to the satisfaction of EPA.

23 F. The independent approach used in this Order is intended to facilitate the  
24 completion of the design and is subject to change should the Work products fail to meet all ROD  
25 requirements or otherwise prove unacceptable to EPA. While EPA is not requiring that the  
26 Respondents complete the Remedial Design work jointly, EPA reserves the authority to assign  
27 joint-and-several responsibility for the same or other work in the future.

1           G.     The independent assignment of Work to the Respondents does not indicate that  
2 (1) groundwater contamination originating from or related to the various contributing sources is  
3 divisible; (2) particular groundwater contaminants can be attributed solely to one Respondent  
4 and not to the other; (3) remedial systems developed for this remedy can be operated  
5 independently without regard to or interaction with one another and without having to meet a  
6 single set of objectives; (4) responsibility for conducting the ultimate remedial action can be  
7 considered separable and distinct.

8           H.     After discussing the SOW and amendments thereto with EPA, Respondent  
9 Montrose has informed EPA that it is interested in performing the Remedial Design Work  
10 required of Respondent Montrose under this order (and as set out in the SOW) because of  
11 Respondent Montrose's belief that undertaking such Work will allow the preparation, by  
12 Respondent Montrose, of a cost-effective Remedial Design, consistent with the EPA Record of  
13 Decision and the District Court's finding of liability in the matter of *United States v. Montrose*  
14 *Chemical Corp. of California*, et al., No. CV 90-3122-R (C.D. Cal.).

15           I.     After discussing the SOW and amendments thereto with EPA, Respondent Shell  
16 has indicated its willingness to perform the Remedial Design Work required of Respondent Shell  
17 under this Order (and as set out in the SOW) pursuant to a CERCLA Unilateral Order.

18           J.     EPA has identified other entities as potentially responsible parties under  
19 CERCLA with respect to the Dual Site Groundwater Operable Unit, including Jones, Inc., the  
20 Boeing Company, and the United States General Services Administration ("GSA").  
21 Groundwater Remedial Design Work, to date, has been done by the Respondents under prior  
22 Orders and by EPA. This Order continues this structure with respect to the remaining remedial  
23 design based on EPA's assessment that this structure will allow for the expedited completion of  
24 the Remedial Design Work which in turn will allow for the timely implementation of remedial  
25 actions to clean up groundwater and protect natural resources. EPA will continue its  
26 investigation of other entities that may have contributed to the groundwater contamination and  
27  
28

1 evaluate whether other PRPs should participate in the groundwater remedial action while the  
2 Respondents complete the Work.

## 3 II. FINDINGS OF FACT

### 4 History

5 1. The Montrose Chemical and Del Amo National Priorities List Superfund Sites  
6 ("Sites") are located in Los Angeles County, California. The Montrose Superfund Site was  
7 added to the CERCLA National Priorities List in 1989. The Del Amo Superfund Site was added  
8 to the CERCLA National Priorities List in 2002.

9 2. Montrose operated a technical grade dichloro-diphenyltrichloroethane ("DDT")  
10 pesticide manufacturing plant at 20201 Normandie Avenue in Los Angeles, California from  
11 1947 to 1982 ("Montrose Plant property").

12 3. From 1942 through 1971, a synthetic rubber manufacturing operation, consisting  
13 of three separate plants, covered 280 acres at the Del Amo Site. From 1942 until 1955, the  
14 rubber manufacturing operation consisted of a styrene plant operated by Dow Chemical  
15 Company, a butadiene plant operated by Respondent Shell, and a synthetic rubber (copolymer)  
16 plant operated by U.S. Rubber Company, Goodyear Tire & Rubber Company, and others.  
17 During this period, the United States owned all three plants, which were operated by the above-  
18 noted companies under agreements with the United States. In 1955, the United States sold all  
19 three plants to Respondent Shell, and Respondent Shell continued to operate these plants until  
20 1971.

21 4. Since 1985, Respondent Montrose has been conducting remedial  
22 investigation/feasibility study ("RI/FS") work for the Montrose Chemical Superfund Site under  
23 an administrative order on consent with EPA. EPA has taken over some of the RI/FS work from  
24 Respondent Montrose. Since 1992, Respondent Shell has been conducting RI/FS work for the  
25 Del Amo Superfund Site under an administrative order on consent with EPA.

26 //

27 //

Respondents

5. Montrose Chemical Corporation of California, Inc. owned and operated a DDT manufacturing plant at 20201 Normandie Avenue, Los Angeles County, California from 1947 until 1982.

6. Shell Oil Company owned and operated a synthetic rubber manufacturing facility on 280 acres in Los Angeles, California from 1955 until 1971. Between 1942 and 1955, the plant was owned by the United States War Assets Administration, which has been succeeded by GSA. Respondent Shell and other companies operated the plant under operating agreements with the War Assets Administration. Those agreements are now terminated. From the mid-1940s through 1971, hazardous substances, including some or all of those substances defined in Paragraph 8 below, were disposed of at the Del Amo Site.

Releases of Hazardous Substances

7. Releases of hazardous substances, pollutants or contaminants from the former DDT pesticide manufacturing plant operated by Respondent Montrose, including but not limited to chlorobenzene, DDT and parachlorobenzene sulfonic acid, have resulted in hazardous substance contamination in the groundwater. Chlorobenzene is present in groundwater at concentrations up to approximately 400,000 ppb.

8. Releases of hazardous substances from the former Del Amo Synthetic Rubber Manufacturing plant, including but not limited to benzene, ethylbenzene, trichloroethylene ("TCE") and naphthalene, have resulted in hazardous substance contamination in groundwater. Benzene is present in groundwater at concentrations up to approximately 660,000 ppb.

9. Contamination in groundwater (*i.e.*, contamination in the dissolved phase) from the Montrose Chemical Superfund Site and Del Amo Superfund Site have partially commingled or merged. EPA has found that factors and considerations related to evaluation of remedial alternatives and implementation of remedial design and remedial action at these sites is inextricably related. The groundwater contamination at both sites – part of the "Joint Site" as defined in the ROD – presents a single set of interrelated technical problems. Because the

1 groundwater contamination differs spatially in terms of its physical and chemical properties, the  
2 ROD selects a range of remedial actions, each targeted to discreet physical areas of groundwater  
3 within the Joint Site. The actions selected by the ROD were developed considering their  
4 interdependencies to ensure that they function together to meet the unified ROD standards.

5 10. There is an undetermined quantity of chlorobenzene in the form of dense non-  
6 aqueous phase liquid ("DNAPL") in the vadose zone and in groundwater beneath and adjacent to  
7 Montrose Plant Property. This DNAPL contains a significant percentage of dissolved phase  
8 DDT (while DDT does not appreciably dissolve in water, it dissolves readily in chlorobenzene).  
9 This DNAPL represents a major source of contamination that will continue to threaten  
10 groundwater indefinitely. EPA is separately considering alternatives for remediation of this  
11 DNAPL.

12 11. There is an undetermined quantity of benzene and ethylbenzene in the form of  
13 light non-aqueous phase liquid ("LNAPL") in the vadose zone and in groundwater beneath the  
14 former Del Amo plant property. This LNAPL represents a major source of contamination that  
15 will continue to threaten groundwater indefinitely unless it is removed or destroyed. EPA is  
16 separately considering alternatives for remediation of this LNAPL.

17 12. Hazardous substances originating at the Montrose Chemical and Del Amo  
18 Superfund Sites have migrated in groundwater up to approximately 1.3 miles downgradient from  
19 the former plant properties.

#### 20 Summary of Risks

21 13. Consumption of contaminated groundwater at the Sites could have significant  
22 human health impacts. The excess cancer risk that could accrue from such consumption would  
23 be exceedingly high. Hazardous substance contamination in the groundwater at the Sites  
24 exceeds drinking water maximum contaminant levels for a number of hazardous substances  
25 including but not limited to chlorobenzene, benzene, ethylbenzene, chloroform, trichloroethylene  
26 (TCE), and perchloroethylene (PCE). Concentrations of chlorobenzene and benzene are many  
27 thousands of times greater than the respective drinking water standards for these chemicals.  
28

1 Currently, contaminated groundwater at the Montrose Chemical and Del Amo Superfund Sites is  
2 not being used as drinking water, in part due to the contamination. However, the State of  
3 California has classified the groundwater at the Sites as potential sources of drinking water.

4 14. Actual or threatened releases of hazardous substances to and in groundwater at the  
5 Sites may present an imminent and substantial endangerment to public health, welfare, or the  
6 environment.

#### 7 Record of Decision

8 15. The Record of Decision selected remedial actions to address potential human  
9 exposures to contaminated groundwater at the Sites, and to restore groundwater in the area. The  
10 ROD is based on the underlying administrative record which includes, but is not limited to, the  
11 Final Remedial Investigation Report for the Montrose Superfund Site (1998), the Final  
12 Groundwater Remedial Investigation Report for the Del Amo Study Area (1998) and the Joint  
13 Groundwater Feasibility Study for the Montrose and Del Amo Sites (1998). EPA issued the  
14 ROD after public notice and comment on EPA's proposed groundwater remedial actions and the  
15 administrative record file. EPA's consideration of and responses to comments received from  
16 members of the public during the public comment period are contained in Volume II of the  
17 ROD.

18 16. The ROD selected a number of remedial actions, including a number of different  
19 technologies and approaches, to address groundwater contamination at the Sites including but  
20 not limited to: (a) Containment of dissolved-phase groundwater contamination that surrounds the  
21 non-aqueous phase liquid that is present in portions of the groundwater at the Sites; and  
22 (b) Reduction of concentrations of dissolved contaminants in groundwater, outside the area of  
23 groundwater being contained, to levels that no longer pose an unacceptable risk to human health.

#### 24 Enforcement Efforts

25 17. In 1993, EPA issued separate notice letters to Respondents, notifying them that  
26 EPA considered Respondent Shell and Respondent Montrose, respectively, to be potentially  
27 responsible parties with respect to response costs that had been or may be incurred with respect  
28

1 to the groundwater contamination at the Montrose Chemical Superfund Site and the Del Amo  
2 Superfund Site.

3 18. In 1990, EPA filed suit against Respondent Montrose and others seeking past  
4 response costs and a declaratory judgment with respect to future response costs related to the  
5 Montrose Chemical Site (*United States v. Montrose* matter). That case has not yet been  
6 concluded. However, in April 2000, the District Court issued an order finding Respondent  
7 Montrose, among others, liable for all costs of removal or remedial action with respect to  
8 releases at or from the Montrose Plant property.

9 III. CONCLUSIONS OF LAW AND DETERMINATIONS

10 19. The Del Amo Superfund Site is a "facility" as defined in Section 101(9) of  
11 CERCLA, 42 U.S.C. §9601(9). The Montrose Chemical Superfund Site is also a "facility" as  
12 defined in Section 101(9) of CERCLA, 42 U.S.C. §9601(9). The Joint Site as set forth in  
13 Section 6 of the ROD is also a facility as defined in Section 101(9) of CERCLA §9601(9).

14 20. Respondent Montrose Chemical Corporation of California, Inc. is a "person" as  
15 defined in Section 101(21) of CERCLA, 42 U.S.C. §9601(21).

16 21. Respondent Shell Oil Company is a "person" as defined in Section 101(21) of  
17 CERCLA, 42 U.S.C. §9601(21).

18 22. Respondent Montrose Chemical of California, Inc. is a "liable party" as defined in  
19 Section 107(a) of CERCLA, 42 U.S.C. §9607(a), and is subject to this Order under Section  
20 106(a) of CERCLA, 42 U.S.C. §9606(a).

21 23. Respondent Shell Oil Company is a "liable party" as defined in Section 107(a) of  
22 CERCLA, 42 U.S.C. §9607(a), and is subject to this Order under Section 106(a) of CERCLA, 42  
23 U.S.C. §9606(a).

24 24. Chlorobenzene, benzene, DDT, DDE, DDD, PCE, TCE, TCA, DCE, DCA, vinyl  
25 chloride, chloroform, naphthalene, ethylbenzene and other contaminants are present in the  
26 commingled contaminated groundwater plume at the Dual Site Groundwater Operable Unit at  
27  
28

1 the Montrose Chemical and Del Amo Superfund Sites and are "hazardous substances" as defined  
2 in Section 101(14) of CERCLA, 42 U.S.C. §9601(14).

3 25. The disposal and subsequent migration of hazardous substances at the Dual Site  
4 Groundwater Operable Unit at the Montrose Chemical and Del Amo Superfund Sites constitutes  
5 a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. §9601(22).

6 26. The actual and potential for future migration of hazardous substances at and from  
7 the Dual Site Groundwater Operable Unit at the Montrose Chemical and Del Amo Superfund  
8 Sites poses a threat of a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C.  
9 §9601(22).

10 27. The release and threat of release of one or more hazardous substances at and from  
11 the Dual Site Groundwater Operable Unit at the Montrose Chemical and Del Amo Superfund  
12 Sites may present an imminent and substantial endangerment to the public health or welfare or  
13 the environment.

14 28. The groundwater contamination and endangerment at the Dual Site Groundwater  
15 Operable Unit at the Montrose Chemical and Del Amo Superfund Sites constitute an indivisible  
16 injury. The actions required by this Order are necessary to protect the public health or welfare or  
17 the environment.

#### 18 IV. NOTICE TO THE STATE

19 29. Prior to issuing this Order, EPA notified the California Environmental Protection  
20 Agency, Department of Toxic Substances Control, that EPA would be issuing this Order.

#### 21 V. ORDER

22 30. Based on the foregoing Findings of Fact, Conclusions of Law, and  
23 Determinations, EPA hereby orders the Respondents to comply with all provisions and  
24 requirements of this Order, including, but not limited to, all attachments to this Order, all  
25 documents incorporated by reference into this Order, and all schedules and deadlines established  
26 by or through the SOW.

1 VI. DEFINITIONS

2 31. Unless otherwise expressly provided herein, terms used in this Order which are  
3 defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning  
4 assigned to them in CERCLA or its implementing regulations. Terms specifically defined in the  
5 ROD shall have the same definition as in the ROD, unless otherwise noted below. Whenever  
6 terms listed below are used in this Order or in the documents attached to this Order or  
7 incorporated by reference into this Order, the following definitions shall apply:

8 A. "CERCLA" shall mean the Comprehensive Environmental Response,  
9 Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§9601 *et seq.*

10 B. "Claimant Respondent" shall refer to a Respondent that has issued a claim  
11 pursuant to the provisions in the paragraph in which the term appears.

12 C. "Day" shall mean a calendar day unless expressly stated to be a working day.  
13 "Working Day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In  
14 computing any period of time under this Order, where the last day would fall on a Saturday,  
15 Sunday, or Federal holiday, the period shall run until the end of the next Working Day.

16 D. "DTSC" shall mean the State of California Environmental Protection Agency,  
17 Department of Toxic Substances Control.

18 E. "Dual Site Operable Unit Remedy" shall mean the remedy selected in the ROD,  
19 and the associated physical space to which the ROD applies, and defined as the "Joint Site" by  
20 the ROD in Part II, Article 6, pages 6-1 through 6-3.

21 F. "EPA" shall mean the United States Environmental Protection Agency.

22 G. "National Contingency Plan" or "NCP" shall mean the National Contingency Plan  
23 promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. §9605, codified at 40 C.F.R. Part  
24 300, including any amendments thereto.

25 H. "On-site" and "off-site" shall have the meaning ascribed to these terms by the  
26 National Contingency Plan, with respect to the Montrose Chemical Superfund Site, the Del Amo  
27 Superfund Site, and the Dual Site Groundwater Operable Unit.

1 I. "Paragraph" shall mean a portion of this Order identified by an Arabic numeral.

2 J. "Performance Standards" shall mean those cleanup standards, standards of  
3 control, and other substantive requirements, criteria or limitations, identified in the Record of  
4 Decision, that the remedial action and/or the Work required by this Order must attain and  
5 maintain (including, but not necessarily limited to, Article 13 of the Record of Decision).

6 K. "Record of Decision" or "ROD" shall mean the EPA Record of Decision for Dual  
7 Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites (March  
8 1999) (two volumes).

9 L. "Remedial Design" or "RD" shall mean the phase of work to develop the detailed  
10 plans and specifications required in order to implement the remedial action selected by the ROD  
11 for the Dual Site Groundwater Operable Unit.

12 M. Unless otherwise explicitly specified, "Remedial Design Work" or "Work" shall  
13 mean those activities that the Respondents are required to perform under this Order. The  
14 Remedial Design Work specified in this Order is inclusive of and expands on the "Initial  
15 Remedial Design Work" cited in previous versions of this Order.

16 N. "Respondent Montrose" shall refer to Montrose Chemical Corporation of  
17 California, Inc.

18 O. "Respondent Shell" shall refer to Shell Oil Company.

19 P. "Response Costs" shall mean all costs, including direct costs, indirect costs, and  
20 accrued interest, incurred by the United States to perform or support response actions at the  
21 Sites. Response costs include but are not limited to the costs of overseeing the Work, such as the  
22 costs of reviewing or developing plans, reports and other items pursuant to this Order and costs  
23 associated with verifying the Work.

24 Q. "Statement of Work" or "SOW" shall mean the attached Amended Statement of  
25 Work for Remedial Design for the Dual Site Groundwater Operable Unit, as set forth in the  
26 Attachment to this Order. The Statement of Work is incorporated into this Order and is an  
27 enforceable part of this Order.

1 R. "Section" shall mean a portion of this Order identified by a Roman numeral and  
2 includes one or more paragraphs.

3 S. "Sites" unless otherwise explicitly specified, shall mean the Montrose Chemical  
4 Superfund Site and the Del Amo Superfund Site.

5 T. "State" shall mean the State of California.

6 U. "United States" shall mean the United States of America.

7 VII. NOTICE OF INTENT TO COMPLY

8 32. The Respondent shall provide, not later than fourteen (14) days after the effective  
9 date of this Order, written notice to EPA of the Respondent's irrevocable intent to comply with  
10 this Order. Failure to respond, or failure to provide notice of intent to comply with this Order,  
11 shall be deemed a refusal to comply with this Order. If either of the Respondents does not  
12 unequivocally commit to perform the RD as provided by this Order, such Respondent shall be  
13 deemed to have violated this Order and to have failed or refused to comply with this Order.  
14 Each Respondent's written notice shall describe, using facts that exist on or prior to the effective  
15 date of this Order, any "sufficient cause" defenses asserted by the Respondent under Sections  
16 106(b) and 107(c)(3) of CERCLA. The absence of a response by EPA to the notice of intent to  
17 comply required by this paragraph shall not be deemed to be acceptance of a Respondent's  
18 assertions.

19 VIII. PARTIES BOUND

20 33. This Order shall apply to and be binding on the Respondents, and their respective  
21 directors, officers, employees, agents, successors, and assigns. Respondents are responsible for  
22 carrying out all activities required by this Order. No change in the ownership, corporate status,  
23 or other control of either Respondent shall alter any of the Respondent's responsibilities under  
24 this Order. Noncompliance by one or more of the Respondents with any provision of this Order  
25 shall not excuse or justify noncompliance by any other Respondent.

26 //

27 //

1        34.        Each Respondent shall provide a copy of this Order to any prospective owners or  
2 successors before a controlling interest in the Respondent's assets, property rights, or stock is  
3 transferred to the prospective owner or successor.

4        35.        Each Respondent shall provide a copy of this Order to each contractor, sub-  
5 contractor, laboratory, or consultant retained to perform any Work under this Order, within five  
6 (5) days after the effective date of this Order or on the date such services are retained, whichever  
7 date occurs later. Each Respondent shall also provide a copy of this Order to each person  
8 representing the Respondent with respect to the Work and shall condition all contracts and  
9 subcontracts entered into hereunder upon performance of the Work in conformity with the terms  
10 of this Order. With regard to the activities undertaken pursuant to this Order, each contractor  
11 and subcontractor shall be deemed to be related by contract to the Respondent contracted within  
12 the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. §9607(b)(3). Notwithstanding the  
13 terms of any contract, each Respondent is, and the Respondents are, responsible for compliance  
14 with this Order and for ensuring that their contractors, subcontractors, and agents comply with  
15 this Order, and perform any Work in accordance with this Order.

16        36.        Not later than sixty (60) days prior to any transfer of any real property interest in  
17 any property included within the Del Amo Superfund Site owned by Respondent Shell or any  
18 subsidiary thereof, including, but not limited to the former Del Amo plant property, Respondent  
19 Shell shall submit a true and correct copy of the transfer documents to EPA, and shall identify  
20 the transferee by name, principal business address and effective date of the transfer.

21                    IX.        WORK TO BE PERFORMED

22        37.        The Respondents shall perform the Work required by the Order as further defined  
23 by the attached SOW. In performing the Work required by this Order, the Respondents shall  
24 follow the requirements and procedures of this Order, of the SOW, and of any EPA approved  
25 plans or schedules as required under the SOW to this Order. Any violation of any EPA approved  
26 plan shall be a violation of this Order. In accordance with General Requirements Section 4 of  
27 the attached SOW to this Order, EPA will establish and maintain the enforceable schedule for  
28

1 this Order ("UAO Schedule"). The UAO Schedule shall identify the activities and tasks  
2 (including but not limited to the development, issuance, and revision of deliverables) required to  
3 accomplish the Work under the SOW (not including any additional Work which may be  
4 identified and required of the Respondents by EPA at later dates pursuant to the Additional Work  
5 Provisions of this Order and attached SOW), and shall show the logical scheduling relationships  
6 among these activities and tasks. Deadlines within the EPA-approved UAO Schedule shall be  
7 enforceable under this Order and violations of the schedule by the Respondents shall constitute  
8 violations of this Order. Additional provisions presented in General Provision 4 of the attached  
9 SOW shall apply.

10 38. Each Respondent shall be responsible for performing the work assigned to it  
11 pursuant to the terms and provisions of the SOW. The Respondents shall coordinate the work  
12 such that the combined product of their work results in a design which functionally and  
13 operationally meets all requirements and provisions of the ROD, and any statutes and  
14 regulations, policies and guidances as may apply to the work, to EPA's satisfaction. The SOW  
15 provides additional details regarding this provision.

16 39. All aspects of the Remedial Design Work to be performed by the Respondents  
17 pursuant to this Order shall be under the direction and supervision of a qualified project manager,  
18 the selection of which shall be subject to approval by EPA. Each respondent has previously  
19 designated a project manager for Work done under prior EPA unilateral administrative orders for  
20 groundwater Remedial Design Work. Unless EPA is notified pursuant to this Order that a  
21 Respondent wishes to designate a different project manager, EPA by this Paragraph accepts the  
22 current project managers designated by each Respondent as the Respondent's project manager  
23 for the purposes of this Order.

24 40. If at any time either Respondent proposes to use a different project manager, the  
25 Respondent shall notify EPA and shall obtain approval from EPA before the new project  
26 manager performs any Work under this Order. EPA will review each Respondent's selection of  
27 a proposed project manager. If EPA disapproves of the selection of the project manager by  
28

1 either Respondent, that Respondent shall submit to EPA, within thirty (30) calendar days after  
2 receipt of EPA's disapproval of the project manager previously selected, a list of project  
3 managers, including primary support entities and staff, if any, that would be acceptable to that  
4 Respondent. EPA will thereafter provide written notice to the Respondent of the names of the  
5 project manager(s) that are acceptable to EPA. The Respondent may then select any approved  
6 project manager from that list and shall notify EPA of the name of the project manager selected  
7 within twenty-one (21) days of EPA's designation of the approved project manager.

8 41. EPA will oversee the Respondents' Work under this Order. The Respondents will  
9 support EPA's initiation and implementation of activities needed to carry out its oversight  
10 responsibilities. The Respondents also shall cooperate and coordinate performance of all Work  
11 to be performed under this Order, as well as with work performed by EPA.

12 42. The Work conducted by each Respondent and by the Respondents under this  
13 Order generally shall be consistent with EPA's Remedial Design/Remedial Action (RD/RA)  
14 Handbook, OSWER Guidance 9355.0-04B.

15 43. Until EPA issues written approval of any Work performed by the Respondents or  
16 of deliverables submitted by the Respondents to EPA, such Work or submission will not be  
17 deemed to have been approved by EPA.

18 44. All Work conducted by the Respondents under this Order shall be conducted in a  
19 manner consistent, as determined by EPA, with the SOW and with the remedial actions selected  
20 in the Record of Decision, including but not limited to the Performance Standards and ARARs  
21 established in the ROD. EPA has the right to direct, oversee, approve or disapprove of any and  
22 all Work performed by the Respondents under this Order.

23 45. Notwithstanding any action by EPA, the Respondents remain fully responsible for  
24 achievement of the performance standards in the Record of Decision. Nothing in this Order, or  
25 in the Statement of Work, or in EPA's approval of any Remedial Design Work or any other  
26 submission, shall be deemed to constitute a warranty or representation of any kind by EPA that  
27 full performance of the Remedial Design will achieve the Performance Standards set forth in the  
28

1 ROD. The Respondents' compliance with submissions approved by EPA does not foreclose  
2 EPA from seeking additional Work or response activities to achieve the applicable Performance  
3 Standards.

4 46. The Respondents shall cooperate with EPA in providing information regarding  
5 the Work to the public. At EPA's request and under EPA's direction, the Respondents shall  
6 participate in the preparation of such information for distribution to the public and may  
7 participate in public meetings which may be held or sponsored by EPA to explain the Remedial  
8 Design Work. The Respondents shall not present technical information, sample results, or  
9 technical interpretations to the public independently without prior EPA approval.

10 X. FAILURE TO ATTAIN PERFORMANCE STANDARDS

11 47. In the event that EPA determines that additional response activities are necessary  
12 to design a remedy that will meet applicable Performance Standards, ARARs or ROD  
13 requirements related to the Remedial Design Work, EPA may require the Respondents to  
14 perform additional activities. Unless otherwise stated by EPA, within thirty (30) days of receipt  
15 of notice from EPA that additional response activities are necessary, the Respondents shall  
16 submit for approval by EPA a work plan for additional activities. The plan shall conform to the  
17 applicable requirements of this Order. Upon EPA's approval of the plan, the Respondents shall  
18 implement the plan for additional remedial design activities in accordance with the provisions  
19 and schedule contained therein.

20 XI. ENDANGERMENT AND EMERGENCY RESPONSE

21 48. In the event of any action or occurrence during the performance of the Work  
22 which causes or threatens to cause a release of a hazardous substance or which may present an  
23 immediate threat to public health or welfare or the environment, the Respondents shall  
24 immediately take all appropriate actions to prevent, abate, or minimize the threat, and shall  
25 immediately notify EPA's Remedial Project Manager ("RPM") or, if the RPM is unavailable,  
26 EPA's Section Chief. If neither of these EPA employees is available, the Respondents shall  
27 notify the EPA Emergency Response Section, Region IX by calling (800) 300-2193. The  
28

1 Respondents shall take such action in consultation with EPA's RPM and in accordance with all  
2 applicable provisions of this Order, including, but not limited to, the Health and Safety Plan and  
3 the RD Contingency Plan. In the event that the Respondents fail to take appropriate response  
4 action as required by this Section, and EPA takes that action instead, the Respondents shall  
5 reimburse EPA, in the manner described in Section XXVI of this Order, for all response costs  
6 not inconsistent with the NCP. Section XVI of this Order identifies the EPA RPM and Section  
7 Chief and describes the procedure for changing these designations. The requirements of this  
8 Paragraph are in addition to, and do not alter, the Respondents' obligation to comply with the  
9 requirements of any applicable state or Federal law, including but not limited to the reporting  
10 requirements of Section 103(a) of CERCLA, 42 U.S.C. §9603(a).

11 49. Nothing in the preceding Paragraph shall be deemed to limit any authority of the  
12 United States to take, direct, or order all appropriate action to protect human health and the  
13 environment or to prevent, abate, or minimize an actual or threatened release of hazardous  
14 substances on, at, or from the Montrose Chemical and/or Del Amo Superfund Sites.

## 15 XII. EPA REVIEW OF SUBMISSIONS

16 50. After review of any deliverable, plan, report or other item which is required to be  
17 submitted by the Respondents for review and approval pursuant to this Order, EPA may:

- 18 A. Approve the submission;
- 19 B. Approve the submission with modifications;
- 20 C. Issue comments on the submission and require the Respondent or  
21 Respondents to re-submit the submission for EPA review and approval;
- 22 D. Disapprove the submission and direct the Respondent or Respondents to re-  
23 submit the document after incorporating EPA's comments; or
- 24 E. Disapprove the submission and assume responsibility for performing all or  
25 any part of the response action.

26 51. In the event of approval or approval with modifications by EPA per Paragraph 50  
27 of this Order, the Respondent or Respondents identified by EPA's approval or approval with  
28

1 modifications shall proceed to take any action required by the plan, report, or other item, as  
2 approved or modified by EPA.

3 52. Upon receipt of EPA comments on any submission, the Respondent or  
4 Respondents identified by EPA's comments shall, within the time allowed by the UAO  
5 Schedule, address the comments, correct the deficiencies, perform any other required Work and  
6 resubmit the plan, report, or other item for EPA review and approval. Upon receipt of an EPA  
7 notice of disapproval and a request for a modification per Paragraph 50 of this Order, the  
8 Respondent or Respondents identified by EPA's notice of disapproval and request for  
9 modification shall, within fifteen (15) days (or such longer time as specified by EPA in its  
10 comment letter or notice of disapproval or request for modification), correct the deficiencies,  
11 perform any other required Work and resubmit the plan, report, or other item for EPA review and  
12 approval. Notwithstanding the notice of disapproval, or approval with modifications, the  
13 Respondent or Respondents identified by EPA's comment letter or notice of disapproval or  
14 request for modification, at the direction of EPA, must take any action required by any non-  
15 deficient portion of the submission.

16 53. If any submission is disapproved by EPA pursuant to Paragraph 50(E) of this  
17 Order, the Respondent or Respondents shall be deemed to be in violation of this Order.

### 18 XIII. PROGRESS REPORTS

19 54. In addition to the other deliverables set forth in this Order, the Respondents shall  
20 provide progress reports to EPA with respect to actions and activities undertaken pursuant to this  
21 Order. When requested by EPA, the Respondents shall provide progress reports within five (5)  
22 calendar days (or such longer time as specified by EPA) or at any technical or administrative  
23 meetings held in accordance with this SOW. The Respondents shall otherwise issue such  
24 progress reports when 1) significant issues arise, or milestones occur, during execution of the  
25 Work, or 2) when EPA requests such progress reports of the Respondents. At a minimum these  
26 progress reports shall:

- 1           A. Describe the actions which have been taken to comply with this Order since  
2           the last progress report;
- 3           B. Describe all Work planned for the next three months with schedules relating  
4           such Work to the overall project schedule for RD completion; and,
- 5           C. Describe all problems encountered with the overall implementation of this  
6           Order and any anticipated problems, any actual or anticipated delays, and  
7           solutions developed and implemented to address any actual or anticipated  
8           problems or delays.

9 EPA may waive these requirements for progress reports, in whole or in part, during project  
10 execution at its discretion if it finds that it is sufficiently aware of ongoing work that one or more  
11 such reports are unnecessary.

12           XIV.       QUALITY ASSURANCE, SAMPLING AND DATA ANALYSIS

13           55.       The SOW puts forth work and requirements for quality assurance and sampling  
14 and analysis that the Respondent shall follow in performing the Work under this SOW. The  
15 Respondents shall use quality assurance, quality control, and chain of custody procedures for all  
16 samples in accordance with "EPA Requirements for Quality Assurance Project Plans" (March  
17 2001) (EPA QA/R5); "Sampling and Analysis Guidance and Template" (Version 2, R9QA/002,  
18 March 2000), and subsequent amendments to such guidance upon notification by EPA to the  
19 Respondents of such amendment. Deviations to guidance, identified above, may be made by the  
20 Respondents with prior EPA written approval. Prior to commencement of any monitoring or  
21 sampling field effort under this Order, the Respondents shall submit for EPA approval a Field  
22 Sampling Plan for the effort and also submit (or propose applying a previously EPA- approved  
23 and applicable) Quality Assurance Project Plan ("QAPP") consistent with the requirements and  
24 procedures set out in the SOW. The Respondents shall ensure that EPA personnel and its  
25 authorized representatives are allowed access at reasonable times to all laboratories utilized by  
26 Respondent in implementing the Work. In addition, the Respondents shall ensure that such  
27 laboratories shall analyze all samples submitted pursuant to the QAPP for quality assurance  
28

1 monitoring. The Respondents shall ensure that the laboratories that the Respondents use for  
2 analyses of samples taken pursuant to this Order perform all analyses according to accepted EPA  
3 methods. Accepted EPA methods consist of those methods which are documented in the  
4 "Contract Lab Program Statement of Work for Multimedia, Multiconcentration Inorganic  
5 Analysis" (Doc. No. ILM05.2) (Sept. 2002) and the "Contract Lab Program Statement of Work  
6 for Multimedia, Multiconcentration Organic Analysis" (Doc. No. OLM04.2) (Fall 1999), and  
7 any amendments thereto made during the course of implementation of this Order. The  
8 Respondent shall also ensure that all laboratories Respondent uses for analyses of samples taken  
9 pursuant to this Order participate in an EPA or EPA-equivalent QA/QC program. The  
10 Respondents shall ensure that all field methodologies utilized in collecting samples for  
11 subsequent analysis pursuant to this Order will be conducted in accordance with the procedures  
12 set forth in the QAPP approved by EPA. Upon the request of EPA, the Respondents shall  
13 provide copies of laboratory standard operating procedures ("SOP"), method detection limit  
14 studies, and recovery analyses for methods being used. Should the Respondents identify the  
15 need to use modified methods, the Respondents shall propose such methods to EPA, provide  
16 complete details of modifications proposed and laboratory documentation demonstrating the  
17 performance of the modified method, and receive EPA approval prior to using the modified  
18 methods.

19 56. The Respondents shall notify EPA not less than seven (7) days in advance of any  
20 sample collection activity. At the request of EPA, the Respondents shall allow EPA or EPA's  
21 representative(s) to take split or duplicate samples of any samples collected by the Respondents  
22 with regard to the Work. In addition, EPA shall have the right to take any additional samples  
23 that EPA deems necessary. The Respondents shall follow all field work provisions as set forth in  
24 the SOW.

25 57. The Respondents shall submit to EPA, on a timely basis, copies of all sampling  
26 results, underlying data packages, QA/QC information and/or any other test results or data  
27  
28

1 obtained or generated by, or on behalf of, the Respondents with respect to Work required under  
2 this Order.

3 XV. COMPLIANCE WITH APPLICABLE LAWS

4 58. All activities by the Respondents pursuant to this Order shall be performed in  
5 accordance with or designed to comply with the requirements of all Federal and state laws and  
6 regulations, including, but not limited to the applicable or relevant and appropriate requirements  
7 ("ARARs") and other laws identified in the ROD. EPA has determined that the activities  
8 contemplated by this Order will be consistent with the National Contingency Plan.

9 59. Except as provided in Section 121(e) of CERCLA, 42 U.S.C. §9621(e), and the  
10 NCP, no permit shall be required for any portion of the Work conducted entirely on-site. Where  
11 any portion of the Work requires a Federal or state permit or approval, the Respondents shall  
12 submit timely applications and take all other actions necessary to obtain and to comply with all  
13 such permits or approvals.

14 60. This Order is not, and shall not be construed to be, a permit issued pursuant to any  
15 Federal or state statute or regulation.

16 XVI. REMEDIAL PROJECT MANAGER

17 61. Except as provided in Section XXVI of this Order, all communications, whether  
18 written or oral, from either a Respondent or the Respondents (as required under the SOW) to  
19 EPA shall be directed to EPA's Remedial Project Manager or, if the RPM is unavailable, to the  
20 EPA Section Chief. The Respondents shall submit to EPA three copies of all documents,  
21 including plans, reports, and other correspondence, which are developed pursuant to this Order,  
22 and shall send these documents by overnight mail, unless otherwise specified by the RPM. The  
23 Respondents shall also submit one copy of each document to the DTSC representative identified  
24 below. At EPA's request, one or more of these copies shall be sent directly to the EPA support  
25 contractor for this project.

26 //

27 //

1 EPA's Remedial Project Manager is:  
2 Jeff Dhont  
3 Remedial Project Manager  
4 U.S. Environmental Protection Agency  
5 75 Hawthorne Street (SFD 7-1)  
6 San Francisco, CA 94105  
7 (415) 972-3020

8 EPA's Section Chief is:  
9 Roberta Blank  
10 Chief, Site Cleanup Section 1  
11 U.S. Environmental Protection Agency  
12 75 Hawthorne Street (SFD 7-1)  
13 San Francisco, CA 94105  
14 (415) 972-3169

15 DTSC's Representative is:  
16 Safouh Sayed  
17 Department of Toxics Substances Control, Region 4  
18 5796 Corporate Avenue  
19 Cypress, CA 90630  
20 (714) 484-5478

21 EPA has the non-reviewable right to change its Remedial Project Manager or Section Chief. If  
22 EPA changes its Remedial Project Manager or Section Chief, EPA will inform the Respondents  
23 in writing of the name, address, and telephone number of the new Remedial Project Manager or  
24 Section Chief.

25 62. EPA's RPM and Section Chief shall have the authority vested in a Remedial  
26 Project Manager or On-Scene Coordinator ("OSC") by the National Contingency Plan, 40 C.F.R.  
27 Part 300. EPA's RPM and/or Section Chief shall have authority, consistent with the National  
28 Contingency Plan, to halt or direct changes to any Work required by this Order, and to take any  
necessary response actions.

29 XVII. ACCESS TO PROPERTY NOT OWNED BY RESPONDENT

30 63. If property subject to or affected by the Work is owned in whole or in part by one  
31 or more parties other than the Respondents, the Respondents shall obtain, or use best efforts to  
32 obtain, access agreements from the present owner(s). Such agreements shall provide access for  
33 EPA, its contractors or designees, the state and its contractors, and the Respondent's or

1 Respondents' authorized representatives and contractors, and such agreements shall specify that  
2 the Respondents, individually and jointly, are not EPA's representative with respect to any  
3 liability associated with Work conducted by the Respondents at the Sites. The Respondents shall  
4 hold EPA and its officials, agents, employees, contractors, subcontractors, or representatives  
5 harmless for or from any and all claims or causes of action or other costs incurred by EPA,  
6 including but not limited to attorneys fees and other expenses of litigation and settlement arising  
7 from or on account of acts or omissions of the Respondents, its officers, directors, employees,  
8 agents, contractors, subcontractors, and any persons acting on their behalf or under their control,  
9 in carrying out activities pursuant to this Order. Copies of such access agreements shall be  
10 provided to EPA prior to the Respondents' initiation of field activities. The Respondents' best  
11 efforts to obtain property access shall include providing reasonable compensation to any property  
12 owner. If access agreements are not obtained by the Respondents, then the Respondents shall  
13 immediately notify EPA of its failure to obtain access. Subject to EPA's non-reviewable  
14 discretion, EPA may use its legal authorities to obtain access for the Respondents, may perform  
15 those response actions with EPA contractors at the property in question, or may terminate the  
16 Order if the Respondents cannot obtain access agreements. If EPA performs those tasks or  
17 activities with contractors and does not terminate the Order, the Respondents shall perform all  
18 other activities not requiring access to that property. The Respondents shall integrate the results  
19 of any such tasks undertaken by EPA into their reports and deliverables. Respondents shall  
20 reimburse EPA, pursuant to Section XXVI of this Order, for all response costs (including  
21 attorney fees) incurred by the United States to obtain access for Respondents.

22 XVIII. ACCESS AND DATA/DOCUMENT AVAILABILITY

23 64. The Respondents shall allow EPA and its authorized representatives and  
24 contractors to enter and freely move about all property subject to or affected by the Work under  
25 this Order for the following purposes: inspecting conditions, activities, the results of activities, or  
26 records related to the Work; reviewing the progress of the Respondents in carrying out the terms  
27 of this Order; conducting tests as EPA or its authorized representatives or contractors deem  
28

1 necessary; using a camera, sound recording device or other documentary type equipment; and  
2 verifying the data submitted to EPA by the Respondents. The Respondents shall allow EPA and  
3 its authorized representatives to, on request, copy all records, files, photographs, documents,  
4 sampling and monitoring data, and other writings related to Work undertaken in carrying out this  
5 Order. Nothing herein shall be interpreted as limiting or affecting EPA's right of entry or  
6 inspection authority under Federal law.

7 65. Either of the Respondents may assert a claim of business confidentiality covering  
8 part or all of the information submitted to EPA pursuant to the terms of this Order under 40  
9 C.F.R. §2.203, provided such claim is not inconsistent with Section 104(e)(7) of CERCLA, 42  
10 U.S.C. §9604(e)(7) or other provisions of law. This claim shall be asserted in the manner  
11 described by 40 C.F.R. §2.203(b) and substantiated by the Claimant Respondent at the time the  
12 claim is made. Information determined to be confidential by EPA will be given the protection  
13 specified in 40 C.F.R. Part 2. If no such claim accompanies the information when it is submitted  
14 to EPA, it may be made available to the public by EPA or the state without further notice to the  
15 Claimant Respondent. The Claimant Respondent shall not assert confidentiality claims with  
16 respect to any data related to conditions at the Sites, sampling, monitoring, or reports presenting  
17 or evaluating such information.

18 66. In reference to claims referenced in the last paragraph, any Claimant Respondent  
19 shall maintain for the period during which this Order is in effect, an index of documents that the  
20 Claimant Respondent claims contains confidential business information. The index shall  
21 contain, for each document, the date, author, addressee, and subject of the document. Upon  
22 written request from EPA, the Claimant Respondent shall submit a copy of the index to EPA.

23 67. The Respondents shall, fourteen days prior to any off site shipment of hazardous  
24 substances from the Sites to an out-of-state waste management facility, provide written  
25 notification to the appropriate state environmental official in the receiving state, and to EPA's  
26 Remedial Project Manager, of such shipment of hazardous substances. However, this  
27  
28

1 notification requirement shall not apply to any samples sent off-site for laboratory analysis. The  
2 notification shall be in writing, and shall include the following information, where available:

- 3 A. The name and location of the facility to which the hazardous substances are  
4 to be shipped;
- 5 B. The type, characteristics and quantity of the hazardous substances to be  
6 shipped;
- 7 C. The expected schedule for the shipment of the hazardous substances;
- 8 D. The method of transportation; and
- 9 E. The planned disposition of the hazardous substances (e.g. treatment, storage,  
10 disposal).

11 The Respondents shall notify the receiving state of major changes in the shipment plan, such as  
12 decision to ship the hazardous substances to another facility within the same state, or to a facility  
13 in another state. Any off-site shipment of hazardous substances shall be accomplished by the  
14 Respondents in a manner consistent with all applicable state and federal law, including but not  
15 limited to Section 121(d)(3), 42 U.S.C. §9621(d)(3), and implementing regulations. If EPA  
16 believes that any such shipment is or will be made in violation of any applicable state or Federal  
17 law, EPA may, under the authority of this Order, direct the Respondents to stop or cease the  
18 shipment until the Respondents demonstrate to the satisfaction of EPA that the Respondents have  
19 come into full compliance with the applicable legal requirement. The provisions of this  
20 paragraph do not relieve the Respondents of the responsibility to comply with all other  
21 applicable state or federal law regarding the transportation, storage, treatment or disposal of  
22 materials shipped off-site by the Respondents.

### 23 XIX. DELAY IN PERFORMANCE

24 68. Any delay in performance of this Order that, in EPA's judgment, is not properly  
25 justified by the Respondents, shall be considered a violation of this Order. Any delay in  
26 performance of this Order shall not affect the Respondents' obligations to fully perform all  
27 obligations under the terms and conditions of this Order.

69. The Respondents shall notify EPA of any delay or anticipated delay in performing any requirement of this Order. Such notification shall be made by telephone to EPA's RPM or Section Chief within forty-eight (48) hours after the Respondents first knew or should have known that a delay might occur. The Respondents shall adopt all reasonable measures to avoid or minimize any such delay. Within five (5) business days after notifying EPA by telephone, the Respondents shall provide written notification fully describing the nature of the delay, any justification for delay, any reason why the Respondents should not be held strictly accountable for failing to comply with any relevant requirements of this Order, the measures planned and taken to minimize the delay, and a schedule for implementing the measures that will be taken to mitigate the effect of the delay. Increased costs associated with implementation of the activities called for in this Order are not a justification for any delay in performance.

## XX. MODIFICATIONS

70. This Order and attached SOW may be amended or modified by EPA. Such amendment or modification shall be in writing and shall be signed by the Chief or Acting Chief, Site Cleanup Branch, Superfund Division, U.S. EPA Region IX.

71. The EPA RPM, or in the RPM's absence, the EPA Section Chief, may agree to changes in any approved plan or schedule. Any such changes must be requested in writing by either Respondent and be approved in writing by the EPA RPM, or, in the RPM's absence, by the EPA Section Chief.

72. All modification requests submitted pursuant to this Section shall be sent by certified mail, return receipt requested, or by overnight mail with signature required, and addressed to the EPA RPM.

73. No informal advice, guidance, suggestions or comments by EPA or EPA's representatives regarding reports, plans, specifications, schedules, or any other writing submitted by the Respondents shall relieve the Respondents of their obligations to obtain such formal approval as may be required by this Order, and their obligations to comply with all requirements of this Order.

1                   XXI.       ASSURANCE OF ABILITY TO PERFORM WORK

2           74.       Within thirty (30) days of the effective date of this Order, Respondents shall  
3 provide EPA with documentation that reasonably demonstrates their financial ability to complete  
4 the Work to be performed by the Respondents pursuant to the Order. Examples of adequate  
5 financial documentation that EPA may accept include, but are not limited to, a signed contract  
6 with, or a guarantee on the part of, the Respondents' contractor indicating that it will complete  
7 the Work to be performed (including payment terms, such as whether the contract is pre-paid);  
8 an irrevocable letter of credit payable to EPA from a financial institution; a policy of insurance  
9 that provides EPA with acceptable rights as a beneficiary thereof; an escrow account for the  
10 value of the Work to be performed; or a demonstration by the Respondents that they have  
11 adequate net worth and/or cash flow to pay for the Work to be performed (which may include  
12 financial statements, auditors' reports, and the like).

13           75.       At least seven (7) days prior to commencing any Work pursuant to this Order, the  
14 Respondents shall submit to EPA a certification that the Respondents or their contractors and  
15 subcontractors have adequate insurance coverage or other ability, subject to approval of EPA, to  
16 compensate for liabilities for injuries or damages to persons or property that may result from the  
17 activities to be conducted by or on behalf of the Respondents pursuant to this Order. Adequate  
18 insurance shall include comprehensive general liability insurance and automobile insurance with  
19 limits of one million dollars, combined single limit. If the Respondents demonstrate by evidence  
20 satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that  
21 described above, or insurance covering the same risks but in a lesser amount, then the  
22 Respondents need only provide that portion of the insurance described above that is not  
23 maintained by such contractor or subcontractor. The Respondents shall ensure that such  
24 insurance or indemnification is maintained for the duration of the Work required by this Order.

25                   XXII.       EPA NOT LIABLE

26           76.       EPA, by issuance of this Order, assumes no liability for any injuries or damages  
27 to persons or property resulting from acts or omissions by either Respondent or by the  
28

1 Respondents' directors, officers, employees, agents, representatives, successors, assigns,  
2 contractors, or consultants in carrying out any action or activity pursuant to this Order. EPA  
3 shall not be deemed a party to any contract entered into by the Respondents or their directors,  
4 officers, employees, agents, successors, assigns, contractors, or consultants in carrying out any  
5 action or activity pursuant to this Order.

6 XXIII. ENFORCEMENT AND RESERVATIONS

7 77. Nothing in this Order limits or compromises EPA's right to bring an action  
8 against either or both of the Respondents under Section 107 of CERCLA, 42 U.S.C. §9607, for  
9 recovery of any response costs incurred by the United States, including but not limited to  
10 response costs related to this Order and not reimbursed by either or both Respondents. Such  
11 costs may include but not be limited to past, direct, indirect, and oversight costs, as well as the  
12 costs of compiling the cost documentation to support any cost demand, and accrued interest for  
13 all costs as provided in Section 107(a) of CERCLA, 42 U.S.C. §9607(a).

14 78. Notwithstanding any other provision of this Order, at any time, EPA may perform  
15 its own studies, or elect to complete the Work (or any portion of the Work) pursuant to its  
16 authorities under CERCLA and the NCP, and EPA may seek reimbursement from the  
17 Respondents, for costs, or seek any other appropriate relief.

18 79. Nothing in this Order shall preclude EPA from taking any additional enforcement  
19 actions, including modification of this Order or issuance of additional Orders, and/or selection of  
20 additional remedial or removal actions as EPA may deem necessary, or from requiring either  
21 Respondent or the Respondents in the future to perform additional activities pursuant to  
22 CERCLA or any other applicable law. Respondents shall be liable under CERCLA section  
23 107(a), 42 U.S.C. 9607(a), for the costs of any such additional actions.

24 80. The Respondents are hereby placed on notice that EPA will take any action that  
25 may be necessary, in the opinion of EPA, for the protection of public health and welfare and the  
26 environment, and the Respondents may be liable for the costs of those actions under Section  
27 107(a) of CERCLA, 42 U.S.C. §9607(a).

1        81.        Notwithstanding any provision of this Order, the United States hereby retains all  
2 of its information gathering, inspection and enforcement authorities and rights under CERCLA,  
3 RCRA and any other applicable statutes or regulations.

4        82.        EPA reserves the right to seek enforcement of this Order and to collect civil  
5 penalties under Section 106(b) of CERCLA, 42 U.S.C. §9606(b), of not more than \$32,500 for  
6 each day in which either or both of the Respondents willfully violate, or fail or refuse to comply  
7 with this Order without sufficient cause. In addition, failure to properly perform the Work  
8 required under this Order, or any portion hereof, without sufficient cause, may result in liability  
9 under Section 107(c)(3) of CERCLA, 42 U.S.C. §9607(c)(3), for punitive damages in an amount  
10 at least equal to, and not more than three times the amount of any costs incurred by EPA as a  
11 result of such failure to take proper action.

12        83.        Nothing in this Order shall constitute or be construed as a release from any claim,  
13 cause of action or demand in law or equity against any person for any liability it may have  
14 arising out of or relating in any way to the Sites.

15        84.        If a court issues an order that invalidates any provision of this Order or finds that  
16 either Respondent has, or the Respondents have, sufficient cause not to comply with one or more  
17 provisions of this Order, the Respondents shall remain bound to comply with all provisions of  
18 this Order not invalidated by the court's order.

19                    XXIV.        DOCUMENT SUBMISSIONS

20        85.        Upon request by EPA, the Respondents must submit to EPA all technical  
21 documents and other information (including but not limited to laboratory data packages, field  
22 documentation, electronic and printed copies of data and data interpretation, printed and  
23 electronic copies of draft technical documents) produced by the Respondents in complying with  
24 this Order for possible inclusion in the EPA site file or administrative record file.

25                    XXV.        OPPORTUNITY TO CONFER

26        86.        After EPA issued Administrative Order No. 2008-04 on February 20, 2008,  
27 Respondents requested a conference with the counsel for EPA and the Section Chief of the  
28

1 Superfund Division Site Cleanup Section, or whomever the Section Chief designated as her  
2 representative. The conference was held on March 12, 2008, at EPA's offices in San Francisco.  
3 Because EPA is amending the Order to address certain comments made by Respondents in the  
4 March 12, 2008, conference, EPA is not providing an opportunity for a conference on this  
5 amended Order.

6 87. The purpose and scope of the conference held on March 12, 2008, was limited to  
7 issues involving the implementation of the Work required by this Order and Respondents' intent  
8 to comply with the Order. During the conference and in the letters subsequently submitted to  
9 EPA on or before March 19, 2008, Respondents had the opportunity to present any evidence,  
10 arguments or comments regarding this Order, its applicability, any factual determinations on  
11 which the Order was based, the appropriateness of any action that the Respondents were ordered  
12 to take, or any other relevant and material issue. The conference was not an evidentiary hearing,  
13 and did not constitute a proceeding to challenge this Order. It did not give either Respondent a  
14 right to seek review of this Order, or to seek resolution of potential liability, and no official  
15 stenographic record of the conference was made.

16 XXVI. REIMBURSEMENT OF OVERSIGHT COSTS

17 88. Respondents shall reimburse EPA, on written demand, for all response costs  
18 incurred by the United States in overseeing Respondents' implementation of the Work required  
19 by this Order. EPA may submit to Respondents on a periodic basis a bill for all response costs  
20 incurred by the United States with respect to this Order. EPA will submit its oversight bills  
21 concurrently and jointly to both Respondents, and Respondents' obligation to pay the oversight  
22 bills will be joint and several. Respondents shall, within thirty (30) days of receipt of the bill,  
23 remit by cashiers or certified check for the amount of those costs made payable to the  
24 "Hazardous Substance Superfund," to the following address:

25 U.S. Environmental Protection Agency  
26 Cincinnati Finance Center  
27 P.O. Box 979077  
28 St. Louis, MO 63197-9000

1 Respondents shall send a cover letter with any check and the letter shall identify the Montrose  
2 Chemical Superfund Site and Del Amo Superfund Site – Dual Site Groundwater Operable Unit  
3 by name and make reference to this Order, including the EPA docket number stated above.  
4 Respondents shall send notification of any amount paid, including a photocopy of the check,  
5 simultaneously to counsel for EPA (as identified in Paragraph 86, above).

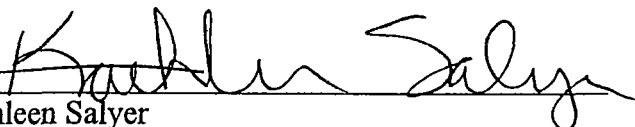
6 89. Interest at the rate established under Section 107(a) of CERCLA, 42 U.S.C.  
7 §9607(a), shall begin to accrue on the unpaid balance from the due date of the original demand,  
8 notwithstanding any objection to any portion of the costs.

9 XXVII. EFFECTIVE DATE AND COMPUTATION OF TIME

10 90. This Order shall be effective immediately upon signature of the Acting Chief or  
11 Chief, Site Cleanup Branch, Superfund Division, U.S. EPA Region IX. All times for  
12 performance of ordered activities shall be calculated from this effective date.

13 91. This Order shall remain in effect until the date that the Respondents receive from  
14 EPA written notice that all Work required by this Order has been completed.

15  
16 So Ordered this 6<sup>th</sup> day of May 2008.

17  
18  
19 By:   
20 Kathleen Salyer  
21 Chief, Site Cleanup Branch  
22 Superfund Division  
23 U.S. Environmental Protection Agency, Region IX

24 ATTACHMENTS

25 Attachment 1: Statement of Work  
26  
27  
28

**Amended**  
**Statement of Work for**  
**Remedial Design Work**  
**(Administrative Order 2008-04A)**  
**Dual Site Groundwater Operable Unit**  
**Montrose Chemical and Del Amo Superfund Sites**

---

**Context and Purpose**

On March 30, 1999, the United States Environmental Protection Agency ("EPA") issued the *Record of Decision for Dual Site Groundwater Operable Unit; Montrose Chemical and Del Amo Superfund Sites* (2 volumes) (hereafter, "**ROD**"). The ROD formally selected the remedial action for cleanup of the dissolved phase contamination and containment of groundwater surrounding non-aqueous phase liquids at both the Montrose Chemical and Del Amo Superfund Sites in Los Angeles, California. The ROD presents EPA's basis for selecting the remedial action, and specifies the standards, requirements, performance standards, and other specifications that shall be attained during the design and implementation of the remedial action selected by the ROD. The remedy selected by the ROD is referred to as the Dual Site Groundwater Operable Unit Remedy.

As a general matter, after issuance of the ROD, the Superfund process proceeds to *remedial design* in which the remedy selected by the ROD is designed; *remedial action* in which the remedy is constructed and implemented; and *operation and maintenance*, in which the remedy, once fully operational, is operated and maintained for the duration of the remedial action.

This Amended Statement of Work ("SOW") is an attachment to, and incorporated by reference into, unilateral administrative order No. 2008-04A, *Administrative Order for Remedial Design Work; Dual Site Groundwater Operable Unit* ("the Order"), issued by EPA to Montrose Chemical Corporation of California ("Respondent Montrose"), and to Shell Chemical Company ("Respondent Shell"). The amendments to both the Order and this SOW are intended to address comments of the Respondents, as conveyed by Respondents in person on March 12, 2008, and in letters sent to EPA the following week. This SOW describes the remaining remedial design work that must be completed for the Dual Site Groundwater Operable Unit Remedy. The remedial design for the remedy is hereafter referred to in this SOW as the "remedial design" or the "Dual Site Groundwater Remedial Design," unless otherwise specified.

The purpose of this SOW is to define the technical work that shall be performed pursuant to the Order. This SOW is dependent on the Order and nothing in this SOW shall supersede the

requirements and provisions of the Order. Likewise, the Dual Site Groundwater remedial design work detailed by this SOW is intended to meet the specifications, performance standards, requirements and provisions of the ROD. Nothing in this SOW shall supersede or be construed as relieving either Respondent from meeting the provisions and requirements of the ROD and it shall be the objective of all remedial design work to meet the ROD provisions and requirements.

### **Relationship to Previous Orders**

In 2003, EPA issued two other related unilateral orders: one to Respondent Montrose (EPA Order No. 2003-06, as amended), and one to Respondent Shell (EPA Order No. 2003-08). The SOWs for those unilateral orders ("original SOWs") addressed the first portion of the work envisioned for the overall remedial design and was termed "**Initial Remedial Design**." Hereafter in this SOW, "Initial Remedial Design" shall refer to the scope, completed tasks, and period of work in which these two previous orders have been executed.

The Order and this SOW are designed to complete the remedial design work, following on from the Initial Remedial Design. It contains the balance of the remedial design work presently envisioned by EPA. It does not include the work previously completed under the Initial Remedial Design Statement of Work. However, to the extent that work under the Initial Remedial Design Statement of Work is not complete, it is included in this SOW. As provided by this SOW and the Order, EPA may further modify or amend the work to be performed if EPA determines it is necessary to adequately complete the Dual Site Groundwater Remedial Design. All work shall be subject to EPA's authority to amend the SOW and to the Additional Work Provision of the Order.

### **Assignment of Work**

The Order is issued to the Respondents in their individual capacities. The SOW specifies which respondent is responsible for each work task. Each respondent shall be independently responsible for the work described in the tasks assigned to it.

The independent approach used in this Order and SOW is intended to facilitate the completion of the design and is subject to change should the work products fail to meet all ROD requirements or otherwise prove unacceptable to EPA. While EPA is not requiring that the Respondents complete the remedial design work jointly, EPA reserves the authority to assign joint-and-several responsibility for the same or other work in the future.

The independent assignment of work to the Respondents does not indicate that (1) groundwater contamination originating from or related to the various contributing sources is divisible; (2) particular groundwater contaminants can be attributed solely to one Respondent and not to the other; (3) remedial systems developed for this remedy can be operated independently without regard to or interaction with one another and without having to meet a single set of objectives; (4) responsibility for conducting the ultimate remedial action can be considered separable and distinct.

## **Prime Requirement for Collective Performance**

As determined in the ROD, the Dual Site Groundwater Operable Unit represents a single technical problem. All components of the remedial design are interrelated and can mutually impact one another. While multiple physical groundwater treatment systems may be constructed and operated as part of the remedy, all such systems operating together must meet the requirements of the ROD.

The Initial Remedial Design culminated in a set of design specifications regarding the performance and operation of the remedial action taken as a whole. These specifications were derived through a sophisticated optimization process. The optimization was performed with the assistance of a groundwater model developed during the Initial Remedial Design. Among these overall specifications are:

- (1) An optimized pumping rate for the overall remedial system;
- (2) Locations for the extraction and injection wells in the overall system (in both the lateral and vertical dimension), including the identification of where injection or extraction wells must be located to provide necessary hydraulic control with a sufficient degree of certainty as determined by EPA;
- (3) The distribution of extraction and injection rates among all wells and/or locations in the overall system, both laterally and among the affected hydrostratigraphic units;
- (4) The approximate number of extraction and injection wells necessary in the overall system based on the assumed or known well-specific capacities; and
- (5) Operational objectives for the various areas of the plume.

The optimization addressed the need to meet all ROD requirements and design objectives with a sufficient degree of certainty, and in a manner sufficiently robust to succeed even if conditions change or some data are not representative. The ROD requirements incorporated in the optimization include, but are not limited to, hydraulic containment, reduction in volume of the contaminant plume within target timeframes, and limitation of adverse migration of contaminants.

Hereafter in this SOW, these optimized specifications and objectives for the overall remedial design shall be referred to as the **"Overall Operational Design."** EPA has provided the Overall Operational Design Report to the Respondents.

EPA will adjust the Overall Operational Design as necessary during the course of the remainder of remedial design, as well as during the remedial action phase, as the need arises. The SOW does not designate the number of treatment systems, nor provide engineering specifications of various physical treatment components (e.g., pumps, types of pipes, electrical systems, footings, conveyances, siting of treatment systems, etc.). The Respondents will perform this "pen-to-paper" design pursuant to this SOW and in accordance with the specifications and requirements of the Overall Operational Design. The following shall apply to all work performed under this SOW.

The effects, capabilities and characteristics of the remedial design reflected by the work products of **both** the Respondents, when considered together as a unified design, shall:

1. Provide for a remedial action that addresses all standards and requirements of the ROD for the unified Dual Site Operable Unit Remedy and all design objectives with a high degree of long-term certainty; and
2. Conform to the Overall Operational Design, including any subsequent modifications by EPA.

The above requirements shall apply to *all* contaminants in the groundwater at the Joint Site, and all affected hydrostratigraphic units. EPA will consider contaminant-exclusive designs submitted by either Respondent as inadequate. The Respondents will need to closely coordinate their work to meet this prime requirement, and must certify to EPA that the remedial design accomplishes the two goals stated above.

### **EPA Work Items**

The Dual Site Groundwater Remedial Design contains design elements applicable to two Superfund Sites. In order to ensure a unified and coordinated response, some of the work envisioned under this SOW will be performed by EPA (hereinafter identified in this SOW as "EPA work" or "EPA work items"). In this SOW, the Respondents are required to perform coordinating activities and support with respect to EPA work items which include continued application, adjustment, and re-calibration of the groundwater model developed during the Initial Remedial Design as well as development and updating of the Groundwater Monitoring and Compliance Plan. While EPA's performance on EPA work items is not subject to the enforceable terms of the Order, the scope of these items is included in this SOW for clarity.

EPA plans to consult and coordinate with the Respondents on EPA work items. This will include receiving input from the Respondents and sharing drafts of work item documents with the Respondents for discussion and consultation prior to their finalization. Discussions between EPA and the Respondents on EPA work items will take place, as necessary, in the meetings between EPA and the Respondents that are required under the General Requirements of this SOW, or at other times as appropriate and mutually agreeable to EPA and Respondents.

### **pCBSA and the Remedial Design**

The Dual Site Operable Unit contains a contaminant that is a by-product of DDT manufacture – para-chlorobenzene sulfonic acid, abbreviated "pCBSA." ROD requirements for pCBSA include an injection standard and certain sampling requirements and institutional controls. The ROD does not assign an in-situ groundwater standard for pCBSA. Information about pCBSA is summarized in Section 8.4 of the ROD.

At the time of the Order's issuance, pilot testing and discussion are underway regarding treatment of pCBSA. While the SOW does not explicitly discuss pCBSA treatment, it is recognized that the design process and the final design may be affected by the extent to which pCBSA is to be treated in the remedial action. The Respondents shall include pCBSA treatment as within the scope of design and the operational specifications that must be addressed as part of

the design.

## **Non Aqueous Phase Liquids and Remedial Design**

At the time of the Order, the Respondents are engaged in performing feasibility studies to support a decision as to whether, and to what degree, non-aqueous phase liquids ("NAPL") are to be recovered or destroyed at the Montrose and Del Amo Superfund Sites. The ROD requires that a second phase of remedial decision-making take place to make this determination. At both of the sites, NAPL is the primary and continuing source of groundwater contamination. See Section 4 of the ROD.

The design of the groundwater treatment system may need to reflect considerations stemming from potential or actual NAPL treatment.

## **Terms and Definitions**

As is already established, "ROD" shall refer to the *Record of Decision for Dual Site Groundwater Operable Unit; Montrose Chemical and Del Amo Superfund Sites* (2 volumes), dated March 30, 1999.

Unless specifically stated otherwise, terms used in the Order have the same meaning when used in this SOW. These definitions are also common to the ROD. These terms include but are not limited to: *joint site, in-situ groundwater standard (ISGS), intrinsic biodegradation, containment zone, breach of containment, chlorobenzene plume, benzene plume, TCE plume, TCE, pCBSA plume, NAPL, hydraulic extraction, reinjection, technical impracticability, technical impracticability waiver, Upper Bellflower, Middle Bellflower B Sand (MBFB Sand), Middle Bellflower C Sand (MBFC Sand), Lower Bellflower Aquitard, Gage Aquifer, Gage-Lynwood Aquitard, Lynwood Aquifer, Lynwood-Silverado Aquitard, and Silverado Aquifer.*

As discussed in Section 7.2 of the ROD, the term "plume" has a specialized use in the ROD. The formal definition of each plume is provided in Section 13, Provision 3 of the ROD. "Plume" does not always refer to the entire distribution of a contaminant in groundwater, but rather refers to a particular portion of the distribution which has a certain set of physical characteristics; and for which the ROD assigns a specific set of remedial actions and objectives (See ROD Section 7). The term "plume" applies to all hydrostratigraphic units within which a referenced plume occurs unless otherwise stated or more-specifically identified.

Unless otherwise specified, the term "well field" herein shall refer to the initial number and spatial distribution of groundwater extraction and injection wells that will be used to execute the requirements of the remedy as selected by the ROD, and also to the particular rates at which each well in the well field will extract or inject groundwater (the distribution of the total pump rate among the wells within the well field), as put forth in the Overall Operational Design Report. The initial well field subject to remedial construction is determined by the Overall Operational Design.

“Active monitoring well network” is defined in Task 3.1.3, below.

“ARARs” shall refer to Applicable or Relevant and Appropriate requirements per the Comprehensive Environmental, Response, Compensation and Liability Act, 42 U.S.C. §§ 9601-9675, as amended.

“FSP” shall refer to Field Sampling Plan.

“MACP” shall refer to the Monitoring and Aquifer Compliance Plan.

“Overall Operational Design” is defined above under the heading “*Prime Requirement for Collective Performance.*”

“pCBSA” shall refer to the contaminant compound para-chlorobenzene sulfonic acid.

“Potential monitoring well network” is defined in Task 3.1.3, below.

“QAPP” shall refer to Quality Assurance Project Plan.

“Respondent” without further specification shall refer to either Respondent Montrose or Respondent Shell within the context of the sentence in which it appears.

“Respondents” shall refer to both Respondent Montrose and Respondent Shell in their individual capacities, unless otherwise stated.

“Successor Tasks” and “Predecessor Tasks” are defined in General Requirements, Section 4.2.

“UAO Schedule” is defined in General Requirement 4.2, below.

# **GENERAL REQUIREMENTS**

## **1 Meetings**

EPA and the Respondents shall hold regular meetings in order to ensure effective communication, resolve issues, monitor and ensure progress, and allow for EPA to oversee the work of the Respondents. Meetings will be held at a mutually agreeable time and location to both EPA and the Respondents. Meetings may be held in person or by conference telephone call per the mutual agreement of the Respondents and EPA.

### **1.1 Technical Meetings**

The Respondents shall attend and participate in technical meetings as scheduled and convened by EPA. EPA anticipates convening such meetings approximately every other month, but the frequency may vary depending on the technical needs of the work ongoing at the time. The Respondents shall make available at the meeting consultants working on matters related to the technical activities to be discussed at the meeting, unless EPA agrees otherwise in advance of the meeting. The meeting shall also serve the purpose of assisting EPA in overseeing the work. Accordingly, at the request of EPA, the Respondents shall provide to EPA pertinent interim work, such as maps, lists, diagrams, descriptions, modeling input or output, or documents, as may apply to the work at the time of the meeting. The Respondents also may request that EPA convene a meeting to address issues that the Respondents identify as work progresses.

If either Respondent intends to have an attorney attend a technical meeting, it shall provide EPA with notice of such intention at least 2 days prior to the meeting. This notice may be given in writing, by telephone or electronic mail. The purpose of this provision is to ensure that EPA has the opportunity to arrange for legal representation that it may deem appropriate. EPA intends to follow the same notification approach with respect to informing the Respondents of EPA's plans to have attorneys present at technical meetings.

### **1.2 Administrative Progress Meetings**

The Respondents shall attend and participate in administrative meetings as scheduled and convened by EPA. It is envisioned that such meetings may occur approximately once per calendar quarter, but the frequency may vary depending on the administrative issues, needs and progress of the work ongoing at the time. Such meetings shall be held to discuss the overall progress of the remedial design; to monitor, coordinate and resolve schedule concerns; and to discuss any matters related to compliance with, and enforcement of, the Order. Technical personnel such as consultants may or may not be present at such meetings, depending on the meeting agenda. The Respondents also may request that EPA convene a meeting to address issues that the Respondents may have as work progresses.

If either Respondent intends to have an attorney attend an administrative meeting, it shall provide EPA with notice of such intention at least 2 days prior to the meeting. This notice may

be given in writing, by telephone or electronic mail. The purpose of this provision is to ensure EPA has the opportunity to arrange for legal representation that it may deem appropriate. EPA intends to follow the same notification approach with respect to informing the Respondents of EPA's plans to have attorneys present at administrative meetings.

## **2 Modification to Documents and Addressing EPA Comments**

EPA shall have approval authority over all documents and other work products submitted by the Respondents under this SOW. The Respondents shall provide EPA with the data, analysis, and consultation necessary to review the documents and other work products and verify the statements and conclusions in the documents and work products.

EPA shall issue to the Respondents EPA's comments on documents submitted pursuant to this SOW, if any. Unless explicitly stated otherwise, each comment shall represent a requested change to the document in order for EPA to find the document acceptable. If the Respondents believe that any of EPA's comments are not clear or if the Respondents do not agree with the comment, the Respondents may confer with EPA's Remedial Project Manager. Unless such comments are withdrawn by EPA, the Respondents shall address all EPA comments by making the requested change to the next draft of the document. The Respondents may, at their discretion (and shall, at the request of EPA) issue a "Response to Comments" document which describes how the Respondents have addressed the comment and states any other background information that EPA should know about the Respondents' response to the comment. However, issuing such a document does not relieve the Respondents of their responsibility to modify the document in accordance with the comment. Comments shall not be deemed addressed by the Respondents until EPA certifies in writing that the comment has been addressed in the document to EPA's satisfaction, or that EPA withdraws the comment based on discussion with the Respondents.

The provisions of Section 2 apply to all deliverables submitted to EPA by the Respondents.

## **3 Additional Work Provision**

Every reasonable effort has been made to make this SOW inclusive of the work that will be necessary. However, in designing remedial systems, unforeseen events and circumstances can occur. When EPA determines that additional work not foreseen by this SOW is necessary in order for the remedial design work under this SOW to be compliant and consistent with the ROD, CERCLA, the NCP, EPA Guidance and Policy, or Applicable or Relevant and Appropriate Requirements (ARARs), then EPA shall identify the work in writing to the Respondents. The Respondents shall perform the work and create to EPA's satisfaction any additional planning documents that may be needed in order to complete the work. These shall be modified by the Respondents in accordance with EPA's comments, if any.

## **4 Division of Work and Enforceable UAO Schedule**

### **4.1 Responsibilities under the Order**

All tasks identified in this SOW shall be performed by each Respondent in its individual capacity, subject to the *Prime Requirement for Collective Performance*, as specified above. See also discussion under "Assignment of Work" in this SOW, above). As an example, for a task that requires both field work and a report, each respondent shall be responsible for performing its own field work and issuing its own report, per the scope of the task. Two exceptions to this provision apply:

- Where a task is explicitly identified in this SOW as being the responsibility of one Respondent, then it shall be the responsibility of that Respondent only; and
- Where a task is explicitly identified in this SOW as an EPA work item, it shall not be the responsibility of either Respondent, except for work that the task may explicitly assign to the Respondents requiring their cooperation or support of EPA regarding the EPA work item.

### **4.2 UAO Schedule Definition and Function**

An enforceable schedule is necessary to the successful execution of the work under this SOW and will ensure that work proceeds in a reasonable and timely manner toward completion. EPA will have discretion to modify the schedule to address circumstances that cannot be foreseen at the time the schedule is initiated, as set forth in this section. EPA plans to afford the Respondents reasonable opportunities to provide input to EPA on the schedule before changes are implemented.

EPA will maintain a "UAO Schedule" which will identify the activities and tasks (including but not limited to the development, submission, and revision of deliverables by the Respondents) that are required to accomplish the work under the SOW. The schedule will show the logical scheduling relationships among these activities and tasks (e.g., successors and predecessors). The deadlines and time frames in the schedule shall be enforceable in accordance with the Order and this Section ("General Requirements," Section 4 of this SOW).

During the Initial Remedial Design, EPA established the UAO schedule using a project-management computer software program that tracks and evaluates interdependencies, relationships, durations, and structure of tasks. EPA will now create a new UAO Schedule for the Order and this SOW which follows on from the Initial Remedial Design Schedule.

The tasks, task durations, start and completion dates, designations of responsibility, logical interdependencies among the tasks that are established within the software, and the implications of those interdependencies when changes are made to task durations in the schedule, shall be considered intrinsic to the UAO Schedule.

The descriptions in the following subsections of this section reference "successor" and

"predecessor" tasks. The meaning of these terms is as follows. If the UAO Schedule establishes a logical dependency between "Task A" and "Task B" such that Task B cannot start or finish until Task A starts or finishes, then Task A is a *predecessor* to Task B, and Task B is a *successor* to Task A. These logical dependencies can be reviewed by EPA or Respondents with the UAO Schedule. There are several possibilities for the relationships between successor tasks and predecessor tasks: (1) the start of the successor depends on the finish of the predecessor; (2) the finish of the successor depends on the finish of the predecessor; or (3) the start of the successor depends on the start of the predecessor.

As work under the Order proceeds, EPA intends to post progress and make changes to the schedule. EPA plans to re-issue the schedule in an electronic format to the Respondents when the schedule changes. The latest and most-updated schedule approved and issued by EPA is the enforceable schedule under the Order. The process for modifying the schedule is put forth in General Requirement 4.4 of this SOW.

### **4.3 Deadlines Under the Order**

The Respondents shall be responsible for meeting the time frames and deadlines in the UAO Schedule for the work assigned. Each Respondent is individually responsible for performing the work assigned to it in accordance with the active UAO Schedule. As previously noted, however, all work shall be subject to the *Prime Requirement for Collective Performance* specified in this SOW, above. The *completion dates* shown on the active schedule for tasks assigned to the Respondents shall be enforceable deadlines under the Order.

### **4.4 Cases Resulting in Changes to the UAO Schedule**

Cases resulting in changes to the UAO Schedule shall fall into five categories. Such changes can cause the deadline for completion of a task or tasks to change from that shown in the existing schedule. The cases are discussed as specific to a single UAO Schedule task, but may apply to more than one task at any given time. These are discussed below.

#### **4.4.1 EPA Approval of Extension/Delay Request of Respondent**

This case applies when the Respondents issue to EPA a justified request to extend the duration or delay the start of a task in the UAO Schedule, in accordance with General Requirement 4.6 of this SOW. In this case EPA may, at its discretion, (A) approve the requested extension or delay, or (B) approve an extension or delay of an alternate amount of time that EPA determines is appropriate, or (C) deny the extension or delay for the task that is the subject of the request. In the cases of approval (A and B), EPA will modify the schedule in accordance with the approved change.

#### **4.4.2 EPA Approval of Extension/Delay Request for a Task that is the Individual Responsibility of One of the Respondents**

This case applies when: (1) EPA approves, at its discretion, an extension to the duration of, or a delay in the start date of, a task that is the individual responsibility of one Respondent, and (2) a

second task that is the responsibility of another Respondent under this SOW is, as defined in the UAO Schedule, a successor task to the first task that was extended or delayed. In this case, EPA will, at its discretion, either (A) approve an extension in the duration or delay in the start date for the successor task by an amount of time corresponding to the approved extension or delay for the predecessor task, or (B) approve an extension in the duration or delay in the start date for the successor task of an alternate amount of time that EPA determines is appropriate, or (C) determine that no extension or delay is appropriate. While approval of such an extension will *not* be automatic, the Respondent need *not* petition EPA for EPA to consider it as a matter of course. In the cases of approval (A and B), EPA will modify the schedule in accordance with the approved change.

#### **4.4.3 Unapproved Delayed Start or Late Completion of a Predecessor Task of a Third Party.**

This case applies when: (1) a task that is the responsibility of an individual Respondent is either delayed or extended, and (2) EPA has not approved the extension of that delay, and (3) a second task that is the individual responsibility of another Respondent under this SOW is, as defined in the UAO Schedule, a successor task to the first task.

In this case, the same results will apply as discussed in Task 4.4.2 above.

#### **4.4.4 EPA Delay on a Predecessor Task.**

This case applies when: (1) EPA takes longer to start or complete an EPA task (e.g. review and comment on a draft deliverable) than provided by the Schedule for that EPA task, and (2) EPA's delay is not due to an action, failure to act, or a delay on the part of the Respondents, and (3) the Respondent's task is a successor to the delayed EPA predecessor task. In this case EPA will modify the schedule to provide either for an extension in the duration of, or delay in the start of, the Respondent's successor task as determined appropriate by EPA based on the type of logical dependency between the tasks. This extension will be automatic; the Respondents need *not* petition EPA for it and EPA will modify the schedule in accordance with the change.

#### **4.4.5 EPA Determines a Need to Modify Schedule.**

EPA maintains the authority to modify the UAO Schedule for appropriate cause with written notice to the Respondents including an explanation of EPA's reasons for the change.

When schedule changes occur, EPA will update the active schedule to reflect the change, and issue a revised active schedule. EPA plans to number the schedule revisions as they are issued to avoid confusion.

### **4.5 Establishing and Continuing the UAO Schedule**

At the outset of work under this SOW, EPA plans to provide the Respondents with a draft of the UAO Schedule and hold conference calls in which EPA will receive input from the Respondents on schedule issues

The UAO Schedule approved by EPA as of or following the date of execution of this Order and SOW shall remain in effect until such time as it may be further modified per the provisions of the Order and this section.

#### **4.6 Requests by Respondent for Deadline Modifications**

Respondents may seek an extension of time, or a delay in the start date, for any task under the Order by petitioning EPA for such an extension along with a justification for the extension. The request shall be made in writing, either by letter or by email, and shall be addressed to the EPA Remedial Project Manager. EPA will respond in writing to the request, either granting the request, a modified version of the request, or denying the request, at its discretion, after considering Respondents' petition and justification. EPA's response will contain the reasons for the action taken. EPA may grant such extensions or delays to a deadline either before or after the deadline expires at its discretion.

### **5 Data Management Plan**

The Respondents submitted and EPA approved a Data Management Plan under the Initial Remedial Design work to address all data acquired during the remedial design and remedial action process, including historical data assimilated into the process as well as new data that may be generated by the Respondents under this SOW. The existing Data Management Plan in the Initial Remedial Design shall remain in effect in this SOW until such time as EPA may require of the Respondents modifications to the Plan and such modifications are approved by EPA. The Respondents shall manage all data in accordance with the Data Management Plan.

If required by EPA, the Respondents shall modify the Data Management Plan in accordance with EPA comments. The Respondents shall amend the plan as necessary to address new types of data as they become available. The modified Data Management Plan shall present the methods for tracking, storing, querying, and retrieving data, the format in which data will be available, the manner of updating the data as new data is acquired, and the means of maintaining data so that modified evaluations can be performed. The plan shall also identify the software to be used, data security, data entry control, transcription error control protocols, minimum data requirements, data format and backup data management. The modified Data Management Plan shall address electronic as well as paper data and information.

As required by the Statement of Work for the Initial Remedial Design, the Respondents have cooperated with EPA to develop a database format and database in which data gathered for the remedial design will be shared commonly among the parties. Under this SOW, the Respondents shall continue with this cooperation and coordination. At a minimum, groundwater quality and water level data, geochemical data, well construction data, aquifer test data, derived values (such as but not limited to transmissivity, hydraulic conductivity and storativity), lithologic logs, reference elevations, hydrostratigraphic base elevations, and soil property data and information, will continue to be assimilated and stored according to a common protocol approved by EPA. The data to be assimilated shall continue to include both available historical data as well as any

data that is collected pursuant to this SOW. EPA will review the proposal by the Respondents within the Data Management Plan and it shall be subject to EPA approval.

EPA will maintain all or part of the database used for the groundwater modeling and remedial design work under this SOW. The Respondents shall provide to EPA any historical data and data collected pursuant to this SOW in a format and manner as requested by EPA that will allow for its ready inclusion into EPA's database. The Respondents shall also ensure the availability of any additional data, information and documents that EPA determines are not necessary to include directly in the database, but nonetheless need to be readily available during the modeling and other activities in this SOW.

The Respondents shall continue to manage all data in accordance with the most recent EPA-approved Data Management Plan unless otherwise approved by EPA.

## **6 Notice of Deficiencies and Stop Work Orders**

If EPA determines that the Respondents are conducting work under this SOW in a manner that:

- Is not in accordance with the ROD, CERCLA, or approved plans under this SOW; or
- May result in data that is unusable or insufficient for the purposes of the remedial design; or
- May result in data or findings that are biased or not objective; or
- May result in a release of hazardous substances to the environment; or
- May result in making cleanup of hazardous substance contamination more costly, difficult, or time consuming; or
- May result in the destruction of or damage to evidence of a release of hazardous substances; or
- May threaten the effectiveness or protectiveness of the remedial action; or
- Is not safe for workers or the public; or
- May result in serious concerns among the public such that more time is necessary for EPA to manage community relations issues; or
- May result in property damage or violate property rights; or
- May violate laws or regulations of the United States, the State of California, or local governmental entities, then

As it determines appropriate, EPA may issue a Notice of Deficiencies to either one or both of the Respondents by electronic mail, facsimile, and/or written letter. The Respondent(s) shall meet with EPA as soon as possible to discuss the EPA-identified deficiencies in the work. EPA may withdraw its identification of some or all of the deficiencies following consultation with the Respondent(s). The Respondent(s) shall then correct all remaining identified deficiencies and

demonstrate those corrections to EPA.

As it determines appropriate, EPA also may issue a Notice of Deficiencies and Stop Work Order to either one or both Respondents by electronic mail, facsimile, and/or written letter. In such an event, after consultation with the Respondent(s), the Respondent(s) shall stop the particular work cited in the Stop Work Order immediately; in such a way that interim public and worker safety is ensured. The Respondent(s) shall then meet with EPA as soon as possible to discuss the deficiencies in the work and reasons for the stop work order. The Respondent(s) shall then correct all identified deficiencies and demonstrate those corrections to EPA. The Respondent(s) shall not resume work on the stopped tasks without EPA approval.

This provision notwithstanding, the Respondents shall not be relieved of responsibility to comply with laws and shall remain fully liable for their actions or for failure to act in any civil case related to work performed under the Order.

## **7 Field Work Provisions**

In addition to any specific provisions below which may apply, the following general provisions shall apply to any field work performed by the Respondents.

The Respondents shall not initiate field work on any particular subtask or task in this SOW without written notice by EPA to proceed. This notice may be given by letter, email, or facsimile. The Respondents shall perform all field work in accordance with EPA-approved Field Sampling Plans ("FSP"), Quality Assurance Plans ("QAPP"), and Work Plans, as may apply to the work, unless otherwise approved by EPA.

The Respondents shall make all field activities and non-privileged documentation available for oversight by EPA, its officers, representatives, contractors, and assigns, at all times. This may include, but not be limited to, preparatory activities and mobilization, demobilization activities, field reconnaissance, safety and "tailgate" meetings, treatment and disposal activities, daily and long-term equipment calibration and setup, borehole and well bore drilling, well development, disposal of investigation-derived-waste, sample collection, boring installation, field laboratory work, preparation and updating of field logs, chain-of-custody, sample identification and documentation, sample handling, sample packaging and shipment, measurements, observations, analytical data, mobile laboratory setup or operation, protection of public safety, and any and all activities related to determining compliance with this SOW, the ROD, the approved plans, and applicable regulation. Upon receiving notice from EPA that it plans to collect split samples or confirmation samples, the Respondents shall assist as requested with EPA's collection of such samples; including providing access to the sampling apparatus, obtaining the sample, and transferring the sample to EPA under appropriate chain-of-custody.

Unless otherwise approved by EPA, the Respondents shall provide EPA with at least seven business days' notice before initiating work in the field so that EPA can ensure that a field oversight representative will be available. The Respondents shall make best effort to provide EPA with the field work schedule for as many days in advance as is available, and to inform

EPA when down time in the field is expected.

The Respondents shall have each member of the field team read the approved health and safety plan and sign a document declaring that they have read it. The Respondents shall also have each member of the field team that will be collecting samples, or directing well installation activities, sign a document declaring that they have read the approved work plans, field sampling plans, and health-and-safety plans, and any other field planning documents related to the effort. The Respondents shall provide this document to EPA upon request. The Respondents shall have a copy of any approved work plan document, FSP and QAPP, and the Health and Safety plan available in the field and the person in charge of the field effort shall be personally responsible for their continued presence and use at the site.

## **8 Analysis of Data Provisions**

The Respondents shall perform all laboratory analysis of environmental sampling data required to fulfill work under this SOW at a laboratory approved by EPA. If the QAPP designates a particular laboratory, then EPA's approval of the QAPP shall designate its approval of the laboratory. However, if the laboratory changes and/or if the QAPP does not designate a laboratory, then the Respondents shall obtain EPA's approval on the use of the proposed laboratory before proceeding pursuant to the change.

The Respondents shall provide to EPA any laboratory standard procedures, method detection limit studies, and laboratory documentation that is requested by EPA pertaining to analyses conducted or to be conducted in response to this SOW. The Respondents shall arrange for and oversee the laboratory's performance of site-specific method detection limit studies and other method verification studies as determined necessary to complete the analytical work under this SOW. Such studies shall generally not be required for unmodified standard EPA procedures, but may be necessary for modified or special procedures.

The Respondents shall perform reasonable data validation of the laboratory performance and make data validation reports available for EPA review. The Respondents shall ensure that sufficient and appropriate laboratory documentation is maintained, per the approved QAPP to allow for a complete and independent validation of data by EPA. The Respondents shall make such documentation available upon request by EPA, and shall allow EPA to speak with the chemist of the laboratory to answer questions which may arise regarding data or data validation. As requested by EPA, Respondents shall analyze laboratory performance evaluation (PE) samples provided by EPA and provide any laboratory results promptly to EPA.

## **9 Preservation of Documents**

Respondents shall retain all non-privileged documentation related to the planning, field and sampling work, field notes and logs, analytical work, analytical results, data and databases, and electronic files associated with the work under this SOW for a period of no less than seven (7)

years from EPA's determination that the work under this SOW is complete, unless otherwise approved by EPA. The Respondents shall make available to EPA any of these documents upon request and allow EPA to copy the documents before any are destroyed, and shall provide EPA at least 60 days written notice of Respondent's intention to destroy the documents or data after the seven-year period has elapsed, prior to destroying any of the documents.

## **10 Combining Deliverables**

The Respondents may find, for reasons of timing or otherwise, that some of the deliverables identified in this SOW may be more efficiently issued under a single cover (one document) rather than two or more as identified in this SOW. The Respondents may petition EPA to permit the combining of certain deliverables, and with EPA's approval, may proceed to combine them according to the petition as may be modified by EPA's approval. EPA may provide approval of such a proposal in writing or by email.

## **TASKS for REMEDIAL DESIGN WORK**

### **1 Contingent Work Supplemental to Initial Remedial Design**

As a contingency, Task 1 of this SOW provides for work that may be needed to supplement work already completed under the Initial Remedial Design. This work will be performed by the Respondents only if EPA identifies the need for such supplemental work and requires the performance of all or part of the scope in this task in writing to the Respondents.

#### **1.1 Supplemental Data Acquisition**

ROD Section 13 Provisions 4.01 - 4.04 require that certain data be acquired to support the remedial design process. Under the Initial Remedial Design, the Respondents performed data acquisition activities as required by the ROD, and documented the results of these efforts in reports. These tasks and activities included:

- Data Acquisition Related to Chlorinated Solvents (e.g. TCE)  
[Respondent Montrose and Respondent Shell independently]
- Data Acquisition Related to Benzene Plume Near WRC Building  
[Respondent Shell]
- Data Acquisition Related to Parachlorobenzene Sulfonic Acid (p-CBSA)  
[Respondent Montrose]
- Additional Monitoring Wells for Model Refinement, including expanded wells and sampling in the Gage Aquifer  
[Respondent Montrose]

This work and the corresponding reports are now completed, or virtually completed, under the SOW for the Initial Remedial Design. Data Acquisition Work presently underway pursuant to Task 1 of the Statements of Work for the Initial Remedial Design Orders will continue under those Orders pending EPA's approval of the work. At the time of issuance of this SOW, EPA is not aware of a need for Data Acquisition work in addition to that being performed under the Initial Remedial Design Orders. EPA may determine, however, that supplemental data collection, analysis, and production of reports is necessary to successfully complete the remedial design. As determined necessary by EPA in order to supplement work conducted under the Initial Remedial Design, the Respondents shall plan for the acquisition of data, perform analysis of the data; and produce reports to reflect the supplemental data collection and analysis pursuant to this task of the SOW.

### 1.1.1 Work Plan for Supplemental Data Acquisition

This task provides for work planning documents for supplemental data acquisition activities.

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

As determined necessary and required by EPA, Respondents shall develop and submit to EPA a Work Plan for Supplemental Data Acquisition ("Supplemental Work Plan") with the objective of obtaining sufficient supplemental groundwater data and information necessary to complete the remedial design.

As appropriate, the work described by the Supplemental Work Plan may include sampling or gauging of existing monitoring or production wells; installation, sampling and gauging of new or additional monitoring wells; collection of data from temporary well points; or collection of other groundwater-related data necessary to meet the objectives of the remedial design.

At a minimum, the objectives of Supplemental Work Plan shall include but not necessarily be limited to:

- Providing water quality and water level information;
- Providing continuing data needed for any ongoing analysis using the remedial design model;
- Allowing for refined assessment of the impacts of groundwater extraction or injection in the well field;
- Refining knowledge of the distribution of contaminants that may impact the remedial design;
- Obtaining hydrostratigraphic information and parameters, and refining the assessment of horizontal and vertical gradients in critical areas; and
- Assessing temporal or spatial shifts in groundwater flow and/or changes in groundwater flow due to groundwater extraction (including pumping that may be undertaken by independent third parties).

Additional objectives applicable only to Respondent Montrose:

- Obtaining sufficient data to establish the extent of the pCBSA plume per ROD Section 13, Provision 4.04;
- Tracking movements of TCE<sup>1</sup>, chlorobenzene, and pCBSA;

---

<sup>1</sup> In this section, TCE refers to trichloroethylene and the family of chlorinated solvents as defined in the ROD; pCBSA refers to para-chlorobenzene sulfonic acid, a groundwater contaminant associated with DDT manufacture)

- Providing for an assessment of groundwater quality and groundwater gradients along the historical sanitary sewer line in the area west of the former Montrose plant property, extending to the west of Western Avenue;
- Evaluating the proximity of the pCBSA plume to water supply wells;
- Assessing influent concentrations of pCBSA, chlorobenzene, benzene, TCE, total dissolved solids, or metals to the groundwater treatment system as may impact the design; and
- Assist in the design of systems as may be determined necessary or appropriate for the treatment of pCBSA or other contaminants.

Additional objectives applicable only to Respondent Shell:

- Characterizing sufficiently for remedial design purposes the TCE contamination in groundwater near the western boundary of the former rubber plant that may be entering the former rubber plant footprint from sources upgradient to the west and northwest of the former rubber plant, or which may have originated within the former plant footprint itself;
- Obtaining sufficient supplemental data to characterize the distribution of benzene, ethyl benzene, naphthalene and other contaminants in areas previously considered to be free of benzene to support the remedial design; this requirement shall apply to both the MBFC and Gage hydrostratigraphic units. It shall also include the area of newly discovered-benzene in the MBFC Sand and Gage Aquifer in the vicinity of monitoring wells SWL0065 and SWL0063; and
- Assessing influent concentrations of benzene, ethylbenzene, naphthalene, TCE total dissolved solids, or metals to the groundwater treatment system as may impact the design.

At a minimum, the Supplemental Work Plan shall include the following major components:

- A description of the objectives for the additional wells / data;
- An identification of the gaps in the current database with respect to the distribution and potential sources of contaminants as context for the acquisition of additional data;
- The identification and rationale for the number and locations of monitoring wells to be installed or samples collected;
- Identification of the property owners at the locations of the proposed wells and any anticipated issues with short- and long-term property access;
- A complete description, including diagrams, of proposed well construction details and specifications; drilling method and all drilling equipment; all pertinent construction materials; measurements of borehole, casing, and annular space; depths of screened and blank casing; proposed pumps, transducers, and any other dedicated or temporary down-hole equipment; methods to be used to determine depths and elevations; wellhead and well vault

construction detail and specifications; and any other related details. Construction diagrams shall be provided relative to the stratigraphy encountered;

- A complete description of proposed well development procedures;
- A complete description of treatment and/or disposal of development water, drilling mud, and any other potentially contaminated media;
- The groundwater sampling procedures and chemical and physical parameters to be included in the sample analyses of the new wells, pending incorporation into the overall monitoring plan; and
- Any other information necessary to the proper analysis and interpretation of the data collected pursuant to this subtask.

EPA may require that the Supplemental Work Plan be appended to include additional field work should EPA determine it is necessary.

### **1.1.2 Data Acquisition: Field Sampling Plan, Quality Assurance Project Plan, and Health and Safety Plan**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

Accompanying the Supplemental Work Plan that EPA may require in accordance with Section 1.1.1 of this SOW, the Respondents shall produce additional plans as necessary for the successful completion of the work specified in the work plans as follows:

- A Field Sampling Plan (FSP). This plan shall include the detailed sampling procedures for collecting samples that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. With EPA approval, this FSP may be combined in the same document with FSP information from other tasks in this SOW that require a FSP. Also, Field Sampling Plans created during the Initial Remedial Design may be used as a basis or starting point for this requirement as approved by EPA.

- A Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. With EPA approval, this QAPP may be combined in the same document with QAPP information from other tasks in this SOW that require a QAPP. Also, Quality Assurance Project Plans created during the Initial Remedial Design may be used as a basis or starting point for this requirement as approved by EPA.
- A site-specific health and safety plan shall be prepared with provisions for the data-acquisition work that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 1(1) and (1)(2). A single comprehensive Health and Safety Plan that is inclusive for all Remedial Design may be created and modified as necessary as more field activities are performed. Also, Health and Safety Plans created during the Initial Remedial Design may be used as a basis or starting point for this requirement.
- A schedule of completion shall be submitted to EPA that shall present a list of the major tasks associated with this data acquisition, along with the start and end dates of each task.

### **1.1.3 Supplemental Field Work for Data Acquisition**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

Each Respondent shall implement the field work put forth in the approved Work Plan and FSP/QAPP as required by Task 1.1.1 and 1.1.2 of this SOW, respectively, according to the schedule put forth in the UAO Schedule. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. If a Respondent believes that the schedule will have to change, the Respondent shall contact EPA and request an approval of a change to the schedule of completion. EPA will then determine whether to approve the requested change. The Respondent shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the TCE Data Acquisition activities.

### **1.1.4 Supplemental Completion Reports for Data Acquisition**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

As required by EPA, each Respondent shall issue a Supplemental Completion Report for each data acquisition task performed under Task 1.1 of this SOW. With EPA approval, either Respondent may combine the content of more than one supplemental report. At a minimum each Supplemental Completion Report shall include (not necessarily in this order):

- The objectives of the investigation and results of the field work in relation to the discussions

and elements of the approved work plan;

- All data derived from the data acquisition effort, including but not limited to water quality data and water levels in all applicable hydrostratigraphic units;
- Sufficient presentation, analysis, and organization of the data to allow for readily understanding and interpreting the data;
- Results of any evaluations or validation of data;
- Well completion documentation, including:
  - Exact well location with coordinates and map relative to surrounding area;
  - Well construction and materials detail;
  - Diagrams of well depths, casing, annular spacing, packing, screened interval;
  - Identification of well screen location relative to actual strata;
- Any and all final sample locations and how these may differ from the original planning documents;
- Property ownership and property access issues and how they were addressed, including but not limited to permits and easements;
- A description of the field activities documenting actual drilling, and sampling and analysis methods and procedures and how any of these may have differed from the originally approved data acquisition planning documents as required above;
- If appropriate, a summary of any additional existing data on the contamination;
- Results of any other measurements or physical assessments (including but not limited to soil grain or permeability analysis, pH, total dissolved solids, total suspended solids, biological indicators and inorganics, etc.) collected as part of this remedial design task;
- Detailed hydrostratigraphy of the area studied;
- Groundwater flow directions and gradients (horizontal and vertical);
- Geologic logs from well installations;
- Nature and extent of dissolved and/or free-phase contamination; locations of sampling points;
- Hydrostratigraphic cross sections, if deemed appropriate by EPA;
- Groundwater elevation contours in each aquifer unit; and
- Any other information necessary to document the completion of the work.

If any of the above items are not applicable to the particular supplemental work performed, at the Respondents' request EPA may waive the requirement to provide that (those) item(s).

## **1.2 Supplemental Compilation of Other Sources of Groundwater Information**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

As determined necessary by EPA to supplement work completed under the Initial Remedial Design, each Respondent shall research, acquire, compile, and update other sources of groundwater quality and water level information from monitoring wells at environmental investigations in the area potentially hydraulically affected by the remedial action anticipated in the design, or in close enough proximity to affect the designed remedial action if extraction or injection were to occur at the locations of the other sources of contamination. Information to be compiled shall include, where available, well construction details, and recent history of well pumping rates, water levels, and water quality data. The compilation shall include the most recent data available from each well in such investigations, regardless of whether the last sampling round included all the wells. The Respondent shall issue a Supplemental Compilation of Other Sources of Groundwater Data Report to EPA containing all information gleaned from the compilation effort and shall modify it according to EPA comments, if any. The Supplemental Report shall include, at a minimum, the status of the investigation discussed, the constituents of concern and analytes being tested for, the hydrostratigraphic units being investigated, the frequency of groundwater sampling for the other source, and information on groundwater gradient and flow direction as pertinent and appropriate. This task is intended to identify information that may bear on the remedial design work; it is not intended to require a detailed history of investigation and remediation at nearby facilities which may have no bearing on the remedial design.

## **1.3 Supplemental Pilot Extraction, Injection and Aquifer Response Testing**

*The work under this task shall be the sole responsibility of Respondent Montrose.*

As determined necessary by EPA to supplement the previously completed Pilot Extraction and Aquifer Response Testing completed during the Initial Remedial Design, Respondent Montrose shall perform a supplemental pilot test in which one or more pilot-scale groundwater extraction wells or injection wells shall be pumped at a rate similar in magnitude to that likely to be used in the full-scale pumping system. The pilot test may consist of one or more distinct timed intervals separated by hiatus to compile or evaluate data. During the test, the water level drawdown or buildup and the change in these parameters with time shall be monitored and recorded by Respondent Montrose in the extraction well(s), injection wells, and in several observation monitoring wells surrounding the extraction and injection well(s). The recovery of the aquifer system after pumping shall also be monitored. Respondent Montrose shall use transducers and electronic recordation where practical. The goals of the supplemental pilot test shall be to:

- Obtain design information about the response of the hydrostratigraphic system to the stress of pumping or injection on a scale approaching that to be used in the full scale system (per well basis), sufficient to proceed with design;
- Obtain data and information regarding water level response, radius of influence, aquifer parameters, and capture zones that can be achieved by a full scale system upon full design;
- To the extent practical, provide information on the nature and specifications of systems that will be necessary as pertinent to the well system, treatment system, and discharge system, so as to allow design of these physical systems to proceed upon completion of the modeling and well field optimization;
- Obtain information about practical injection rates and any groundwater treatment inorganic and organic chemistry issues; and
- Evaluate the above information in a way that can be used in any future use of the groundwater model.

Results from the supplemental pilot test will be used in the continuing groundwater modeling activities, as appropriate. The duration of the test, the number of test intervals, the number of wells to be pumped, the locations of the wells to be pumped and the wells to be monitored, the water-level measurement technology and equipment, the format for reporting the data, the method of disposal of the water pumped and other factors will all be carefully planned and approved by EPA in advance of the test.

### **1.3.1 Supplemental Pilot Extraction and Aquifer Response Test Work Plan**

*The work under this task shall be the sole responsibility of Respondent Montrose.*

Respondent Montrose shall submit to EPA a Work Plan for Supplemental Pilot Extraction, Injection, and Aquifer Response Test in advance of conducting the supplemental pilot testing.

The Pilot test work plan shall, at a minimum and to the extent applicable, include the following components:

- The specific objectives to be met by the pilot testing with the data needs clearly identified;
- Clear identification of the data and interpretation that will be provided after the test;
- Specification, diagrams, and full discussion of the duration of the test, the number of test intervals, the number of wells to be pumped, the locations of extraction wells, injection wells, and monitoring wells to be used for the test, and the water-level measurement technology and equipment, the format for reporting the data, and the method of treatment and disposal of the water pumped, and the rationale for all of the above;
- The methodology and procedures to be followed in conducting the pilot test including the rationale for the number and locations of the pilot wells (both extraction and injection) to be

installed;

- A diagram with a description of any treatment and disposal/injection systems to be tested, along with descriptions of test equipment, experimental procedures, treatability conditions to be tested, and measurements of performance;
- A detailed discussion of the treatment process and how the proposed vendor or technology will meet the performance standards for the site as specified in the ROD;
- A description of pilot system installation and startup;
- A discussion of pilot system operation and maintenance procedures, and operating conditions to be tested;
- Description and depiction of any ancillary facilities required to conduct the testing;
- Identification of the data (type and frequency) that will be collected during the pilot testing as a result of both process and performance monitoring during the pilot testing;<sup>2</sup>
- Identification of the methodology and procedures for data collection during pilot testing and the Data Quality Objectives (DQOs), which define the statistical accuracy, precision, and representativeness required of the data;
- If testing is to be performed off-site, permitting requirements shall be addressed;
- The nature of the quality-control samples needed to meet the data-quality objectives;
- If sampling and analysis of samples will be performed, then the work plan shall include a field sampling plan (FSP) which specifies the detailed sampling procedures for collecting samples during the pilot test that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. With EPA approval, this FSP may be combined in the same document with FSP information from other tasks in this SOW that require a FSP;
- If sampling and analysis of samples will be performed, then the work plan shall include a Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and

---

<sup>2</sup>**Process monitoring** refers to the data-collection activities that pertain to optimizing the extraction/injection wells during the pilot test. The monitored parameters are those that must be checked and recorded periodically to ensure optimal operation of the various components of the extraction/injection wells (e.g., pump conditions, flow rates/injection rates).

**Performance monitoring** refers to the data-collection activities that reflect the effectiveness of the extraction/injection well system (e.g., rate and magnitude of water-level changes in extraction/injection wells and associated monitoring wells).

organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. With EPA approval, this QAPP may be combined in the same document with QAPP information from other tasks in this SOW that require a QAPP;

- Pollution control planning which outlines the process, procedures, and safeguards that shall be used to ensure contaminants or pollutants are not improperly released during the pilot test; and
- Derived-waste management planning which outlines the procedures for managing wastes resulting from conducting the pilot testing, including procedures for transporting these wastes offsite for the purpose of storage, treatment, and/or disposal. This plan shall address how the Respondent will meet all discharge or disposal requirements for any and all treated material, air, water, and expected effluents.

### **1.3.2 Field Work for Supplemental Pilot Extraction, Injection and Aquifer Response Testing**

*The work under this task shall be the sole responsibility of Respondent Montrose*

Respondent Montrose shall implement the field work put forth in the approved Supplemental Pilot Extraction, Injection and Aquifer Response Test Work Plan according to the UAO Schedule. Field work shall be conducted in accordance with the *General Requirement on Field Work* in the General Requirements section of this SOW. Respondent Montrose shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the Pilot and Treatability Testing activities.

### **1.4 Supplemental Pilot Extraction, Injection and Aquifer Response Test Completion Report**

*The work under this task shall be the sole responsibility of Respondent Montrose*

Respondent Montrose shall submit to EPA a Supplemental Pilot Extraction, Injection and Aquifer Response Test Completion Report which provides the results of the pilot testing performed under this task. The Report shall contain the following, at a minimum:

- A discussion of the objectives of the test and any issues that occurred relative to meeting the objectives;
- A documentary and chronological discussion of the preparation and running of the test, including a list of all vendors used; vendor reports should be attached as appendices;
- A discussion of the bases of measure and performance criteria;
- A description of the field activities documenting any well installation or equipment

installation tasks. In addition, the work plan shall include the methods and procedures followed during the pilot testing including a description of events in the field that provide either context or affect the results of the pilot testing (e.g., sampling and analysis; water-level monitoring);

- The results of the pilot testing including data tables and plots, as requested or appropriate, including but not necessarily limited to the following:
  - Pumping/injection rates;
  - Static groundwater-levels before the test;
  - Dynamic groundwater levels; draw-down and recovery of groundwater levels for each monitoring well and the extraction well;
  - Radius of influence;
  - Zones of capture;
  - Chemical concentrations;
- An interpretation of the data from the pilot test as it pertains to aquifer response, well field optimization, yield and capacity, and as needed, modeling parameters.
- Discussion of conclusions regarding design parameters to use for full-scale design of extraction/injection wells (e.g., well flows for different draw-down, radii of influence at different draw-down, hydraulic conductivities to use for different aquifer units, etc.);
- Graphics depicting:
  - Locations of the extraction/injection wells and associated monitoring wells used in the pilot test;
  - Extraction/injection well construction details;
  - Groundwater levels spatially in each aquifer unit;
- Tabular and graphical representations of the data derived during the test;
- A discussion of the remaining data gaps and any recommended further actions; and
- A summary of the findings and conclusions from the test; and
- Appendices:
  - Raw data from the laboratory
  - Drilling/construction logs

If any of the above item(s) is(are) not applicable to the particular supplemental work performed, at the Respondents' request EPA may waive the requirement to provide that (those) item(s).

## **2 Groundwater Modeling, and Optimization of the Well Field and Well Rate Distribution**

Section 13, Provision 11 of the ROD requires Flow and Transport Modeling and Optimization of the Remedial Action. The ROD requires that a computer model be developed for optimizing the remedial design, as well as for use during the remedial action and operation and maintenance phases for the purposes of assessing compliance with ROD requirements and making adjustments to the remedial system to ensure such compliance.

Section 13, Provisions 9 and 10 of the ROD contain various standards regarding the rate of reduction in the volume of the chlorobenzene plume, limiting adverse migration of contaminants, and others. The ROD specifies that the model, once approved by EPA, is to be used as a primary tool in ensuring that the remedial design will meet these requirements.

As discussed below, this model was developed, calibrated, and utilized to optimize the Overall Operational Design and meet all requirements of the ROD. As stated in the *Prime Requirement for Collective Performance* in this SOW, the designs produced by the Respondents pursuant to this SOW are required collectively to comply with the Overall Operational Design. EPA has now issued the Overall Operational Design Report to the Respondents. The following discusses modeling and optimization tasks already performed by EPA under the Initial Remedial Design and identifies continuing EPA work that will be performed during the work under this SOW. The work related to modeling that will be the responsibility of the Respondents are identified as such.

The Statement of Work for Initial Remedial Design, Part II, specifies the work under which the design model was created.

### **Model Development and Calibration**

A site-specific computer-based groundwater flow and contaminant transport model ("the RD model" and "RD modeling") has been developed and calibrated during the Initial Remedial Design and shall be further refined and used during the remedial design for the purposes of (1) assisting in verifying the compliance with ROD performance standards, including but not limited to the plume reduction standards; (2) assisting in evaluating the potential for adverse migration of NAPL and dissolved phase contaminants; (3) assisting in optimizing the remedial design to maximize the effectiveness and certainty of success of the remedial action; and (4) any other purposes determined necessary during the remedial design effort for which use of the RD model is appropriate.

The model utilizes the Parameter Estimation Software Tool (PEST), which allows automatic calibration of the RD model and re-calibration when new data is obtained, and other capabilities.

The tool numerically finds the best set of calibration parameters (i.e., modeled hydrogeologic and physical properties of the natural system), which results in a good match between observed and simulated conditions. PEST also provides capabilities to test sensitivities of modeling results to the modeling uncertainties, run potential failure scenarios for the optimized remedial system, further optimize the remedial system to minimize the probability of failure, and assess compliance with ROD standards over an array of plausible hydrogeologic and physical properties of the natural system.

The development and calibration of the RD model, and a detailed account of the wellfield optimization process, will be documented in the **Model Documentation and Well Field Optimization Report** written by EPA. This document is being completed presently as of the issuance of this SOW.

Throughout development and calibration of the RD model, EPA kept the Respondents informed and requested input on all significant modeling efforts. EPA has interim groundwater modeling memoranda, held groundwater modeling meetings and coordinating conference calls with the Respondents' modeling teams, responded to written correspondence from the Respondents regarding the RD model, tested numerous RD modeling refinements on behalf of the Respondents, and made modeling input and output files available by Internet so that the Respondents can independently verify modeling results and run the model themselves.

### **Optimization of Well Field**

During the Initial Remedial Design, the RD model was used to optimize the remedial well field including the pump rate distribution, and assist in completion of the Overall Operational Design.

Among the factors evaluated in the optimization process are:

- The efficiency and rate of removal of contaminants;
- The rate of reduction of the volume of groundwater with concentrations of contaminants in excess of in-situ groundwater standards (ISGSs) per the ROD;
- Early time performance as defined in the ROD;
- Meeting performance provisions discussed above with respect to reduction of the plume outside the containment zone;
- The certainty of containment of contaminants in the containment zone and over the overall plumes outside the containment zone; and
- Limiting the potential for adverse migration of dissolved contaminants and NAPL during the course of the remedial action.

Among the specifications of the Overall Operational Design are:

- An optimized overall pumping rate for the overall remedial system;

- Locations for the extraction and injection wells in the overall system (in both the lateral and vertical dimension) including the identification of where injection or extraction wells must be located to provide necessary hydraulic control with a sufficient degree of certainty as determined by EPA;
- The distribution of pumping and injection rates among wells and locations in the overall system, both laterally and among the affected hydrostratigraphic units;
- The approximate number of extraction and injection wells necessary in the overall system based on the assumed known well specific capacities;
- Operational objectives for the various areas of the plume.

#### **Further EPA Work with Respect to RD Modeling and Optimization**

The RD model will continue to be used in the remedial design and remedial action phases. EPA plans to proceed with the following activities during the remedial design and remedial action phases after the initial well field optimization is completed:

- Updating the model input database based on any new monitoring data that may have been obtained from pilot tests, aquifer tests, existing or new monitoring wells, temporary well points, or production wells;
- Recalibrating the model when and if needed to accommodate new data that may have been obtained from pilot tests, aquifer tests, existing or new monitoring wells, temporary well points, or production wells; and test the performance of the remedial well field under the updated/revised conditions;
- Performing additional optimization runs and modifying initial design specifications, if warranted based on significant new findings from existing and new extraction and monitoring wells;
- Documenting further changes to and uses of the model;
- Continuing similar coordination with, and solicitation of input from the Respondents on modeling activities; including but not limited to regular documentation of EPA's activities and work, posting of modeling files to the Internet for independent analysis by the Respondents, regular meetings and conference calls, and efforts to address reasonable concerns of the Respondents regarding the model.

## **2.1 Respondent Tasks Regarding Modeling**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

With respect to the additional work and uses of the model mentioned above, Respondents shall participate and provide input on the EPA work related to the modeling effort. This may include, but shall not be limited to:

- Attending modeling meetings and participating in conference calls and web-casts;
- Performing timely reviews of interim modeling information, including but not limited to Internet FTP site information and Interim Modeling Memoranda from EPA, and providing any input the Respondent may have;
- Providing data, data processing, analyses, and tables, databases, input files, and similar types of information as requested by EPA to advance the modeling effort; and
- Providing qualified modelers in the participatory process.

## **3 Groundwater Monitoring and Aquifer Compliance**

The ROD requires groundwater monitoring during remedial design for a variety of purposes. These include but are not limited to monitoring, compliance, assessing progress toward remedial objectives, identifying transgressions of the containment zone, maintaining ongoing measurements of aquifer flow direction and water quality, adjusting aspects of the remedial action (such as well locations and pump rates) during field operation, and the movement of pCBSA with respect to production wells. The intention is to establish compliance requirements and a comprehensive plan for monitoring in one place so that the minimum number of mobilizations of field crews can meet all of the varying objectives for groundwater monitoring that emerge during the remedial design process. Also, a goal of the plan is that any relationships among these objectives can be quickly seen and coordinated.

The monitoring program is designed to be an ongoing process. That is, additional monitoring needs will arise on an ongoing basis during the remedial design, and the monitoring program will be modified to address those needs.

## **3.1 Monitoring and Aquifer Compliance Plan**

*This task is an EPA work item.*

The production of the Monitoring and Aquifer Compliance Plan (MACP) shall be primarily an EPA work item. However, certain components of the MACP will be developed by the Respondents and submitted to EPA for inclusion in the MACP. For simplicity, these work items are separated in different subsections of this task.

EPA plans to develop the Monitoring and Compliance Plan, after conferring with the Respondents and receiving certain deliverables from the Respondents. The Respondents shall also be responsible for work items on this task that are identified following the EPA planned activities.

The Monitoring and Aquifer Compliance Plan (MACP) shall be the authoritative planning document for the groundwater monitoring activities. In the MACP, all objectives for groundwater monitoring from various elements of design activities will be identified, along with the approach to meeting those objectives. The MACP will be amended over time as new objectives and monitoring needs are identified. The MACP will shall meet the following objectives as well as any other objectives identified by EPA as necessary to adequately complete the remedial design process. Section 13, Provision 8.03 of the ROD contains requirements for the MACP.

The MACP shall provide for sampling of monitoring wells sufficient to meet the objectives in the ROD. Additional monitoring wells shall be installed, as necessary, to achieve the objectives of the monitoring plan (See next section of this SOW). Continual monitoring shall be conducted as part of this remedy in accordance with the EPA-approved MACP for as long as the containment zone and plume reduction are in effect as part of the remedy. The frequency of monitoring at any given well in the network at any given time shall be established in the MACP and may be changed over time with EPA approval.

### **3.1.1 Objectives of the MACP with respect to the Containment Zone**

*This task is an EPA work item.*

EPA plans to include MACP monitoring network and provisions provide for:

- Confirmation that contaminants within the containment zone have not left the zone;
- Data sufficient to reliably evaluate compliance with all requirements, standards, and provisions in the ROD;
- Reliable evaluation of the lateral and vertical movements of all contaminants of concern within the containment zone;

- Reliable evaluation of the lateral and vertical movements of benzene, TCE, and chlorobenzene in response to hydraulic extraction in the overall system;
- Evaluation of the effectiveness of partial containment of the TCE plume by hydraulic extraction and the degree of movement of TCE toward the boundary of the containment zone;
- Data sufficient to determine groundwater levels, hydraulic gradients, reliable groundwater elevation contour maps, effects of any local pumping both on and off the Joint Site, and groundwater flow velocities within all of the affected hydrostratigraphic units at the Joint Site being pumped or monitored;
- Verification and evaluation of the zones of capture of extraction wells and the radii of influence of extraction and injection wells;
- Reliable evaluation of gradient control measures;
- Data sufficient to measure and verify draw-down in the immediate vicinity of the NAPL sources due to pumping;
- Evaluation of efforts to optimize the well fields and pump rates associated with hydraulic extraction and aquifer injection of treated water so as to provide the greatest certainty of long-term containment, and reduce the potential for plume interactions and adverse migration of NAPL and dissolved contaminants; and
- Reliable concentrations of contaminants in treatment system influent and effluent, and treatment streams so as to assess the effectiveness and performance of the treatment system.

### **3.1.2 Objectives of the MACP with Respect to Reduction of the Chlorobenzene Plume**

*This task is an EPA work item.*

EPA plans to include within the MACP a well network and provisions for:

- Data sufficient to reliably evaluate compliance with any and all requirements, standards, and provisions in the ROD;
- Reliable estimates of the rate that the volume of contaminated groundwater with concentrations of contaminants above ISGS levels is being reduced;
- Reliable estimates of the rate that mass of contaminants is being removed from the groundwater;
- Reliable estimates of the pore volume flushing rates throughout the remaining plume that is contaminated with concentrations of contaminants in excess of ISGS levels;
- Reliable evaluation of the lateral and vertical movements of all contaminants of concern within the plume reduction zone;

- Reliable evaluation of the lateral and vertical movements of benzene, TCE, and chlorobenzene in response to hydraulic extraction in all hydrostratigraphic units being pumped or monitored;
- Data sufficient to determine groundwater levels, hydraulic gradients, reliable groundwater elevation contour maps, effects of any local pumping both on and off the Joint Site, draw-down, and groundwater flow velocities within all of the affected hydrostratigraphic units being pumped or monitored at the Joint Site;
- Verification and evaluation of the zones of capture of extraction wells and the radii of influence of extraction and injection wells;
- Reliable evaluation of the effectiveness of vertical and horizontal gradient control measures;
- Data sufficient to measure and verify draw-down in the immediate vicinity of the NAPL sources due to pumping;
- Evaluation of efforts to optimize the well fields and pump rates associated with hydraulic extraction and aquifer injection so as to provide the greatest certainty of long-term containment, and reduce the potential for plume interactions and adverse migration of NAPL and dissolved contaminants; and
- Reliable concentrations of contaminants in treatment system influent and effluent, and treatment streams so as to assess the effectiveness and performance of the treatment system.

### 3.1.3 Monitoring Well Network

*This task is an EPA work item.*

EPA plans to maintain within the MACP a master spreadsheet of all monitoring wells being sampled or having water levels measured. The total of all wells being sampled at any frequency for any purpose shall be referred to as the “*active monitoring well network*.” The active monitoring well network shall be shown on a map in the MACP for each hydrostratigraphic unit. Pertinent well construction information shall be available in the MACP. The MACP shall also show a map for each hydrostratigraphic unit that shows all monitoring wells available to the project, including those not presently being sampled. This shall be referred to as the “*potential monitoring well network*.” The spreadsheet of the active monitoring well network shall identify for each well the frequency of sampling, the analytes being sampled, the screened interval, the hydrogeologic unit being monitored by the well, a description of the objectives being addressed by the sampling of the well, including whether the well is a sentinel well (i.e. serves to signify whether there is a transgression of the containment zone).

The approved MACP will establish the monitoring objectives (which shall include but not be limited to the objectives specified in the ROD). During the remedial design phase of the remedy, the wells necessary to meet each objective shall be identified, taking into account the location, construction, and other circumstances associated with all existing wells. Should EPA determine

that additional wells are necessary to meet the objectives in the approved MACP, such wells shall be installed and sampled by the Respondent (See Task 3.5 of this SOW).

### **3.1.4 Monitoring Wells With Regard to Containment**

*This task is an EPA work item.*

EPA plans to include in the MACP provisions for sufficient monitoring wells around the periphery of the containment zone in each hydrostratigraphic unit where the containment zone occurs to ensure that failures of the remedial actions to contain contaminants to the containment zone (i.e. transgressions of containment) will be promptly detected. Sufficient numbers of monitoring wells will be planned in the hydrostratigraphic units below the containment zone to determine that contaminants have not migrated vertically out of the containment zone. Monitoring well construction and locations shall be approved by EPA as part of the remedial design and additional wells may be added as determined necessary by EPA during the remedial action and operation and maintenance (O&M) phase. This may include wells in either aquifers or aquitards.

### **3.1.5 Monitoring Frequency**

*This task is an EPA work item.*

EPA plans to identify within the MACP the frequency of monitoring for all wells in the monitoring network, in accordance with the ability to attain the stated monitoring objectives. Any changes to the monitoring frequency for one or more wells shall be approved by EPA by means of an amendment to the Monitoring Plan which states the justification for the changes.

### **3.1.6 Compliance Monitoring Provisions**

*This task is an EPA work item.*

EPA plans to include within the MACP a strategy and discussion for how compliance with the containment zone shall be verified and monitored. In other words, containment of dissolved phase contamination near the NAPL to the zone of containment identified in the ROD shall be periodically monitored in accordance with the MACP. This strategy shall identify the wells that will be used for this objective, identify any new wells needed, outline the procedure by which a transgression of containment will be identified from the monitoring data, including water level data, pump rate and aquifer response data, or any other data available to assess compliance, and discuss any uncertainties in the data and ways of reducing uncertainties that containment is being maintained.

### 3.1.7 Respondent Responsibilities

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall be available to meet and consult with EPA on EPA work items related to development and modification of the MACP. EPA may also assign to the Respondents in writing additional pertinent activities related to MACP development or modification. The Respondents shall perform such activities and submit analyses requested to EPA for review and approval. This may include producing various graphics or data from field efforts the Respondents have performed, or evaluation of such data.

### 3.1.8 MACP Field Sample Plan and Quality Assurance Plan

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

This portion of the MACP shall be completed by the Respondents. EPA plans to incorporate this portion into the MACP upon approving the completion of this work. The Respondents shall not reference previously- approved documents used during the remedial investigation / feasibility study process but shall create new documents for the remedial design. The MACP shall include the groundwater sampling procedures and chemical and physical parameters to be included in the sample analyses of all wells in the active network. In addition, the MACP shall contain the following:

- A Field Sampling Plan (FSP). This plan shall include the detailed sampling procedures for collecting samples during the well installation and sampling that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. *With EPA approval, this FSP may be combined in the same document with FSP information from other tasks in this SOW that require a FSP.*
- A Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. *With EPA approval, this QAPP may be combined in the same document with QAPP information from other tasks in this SOW that require a QAPP.*
- A site-specific health and safety plan shall be prepared with provisions for the data-acquisition work that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40

CFR 300.150 of the NCP and 29 CFR 1910.120 1(1) and (1)(2). A single comprehensive Health and Safety Plan that is inclusive for all Remedial Design may be created, and modified as necessary.

### **3.1.9 Direct Monitoring of Intrinsic Biodegradation**

*This task shall be the sole responsibility of Respondent Shell.*

Section 13, Provision 8.03.06 requires monitoring of rates of intrinsic biodegradation in the benzene plume. This portion of the MACP will be produced by the Respondent Shell, subject to EPA review and approval. EPA intends to incorporate this portion of the MACP into the MACP upon approving this portion of the document. The MACP shall provide for monitoring and verification of the continued reliability of intrinsic biodegradation to contain the benzene plume in the UBF and the MBFB Sand by actual periodic confirmation of the biological activity in the benzene plume. The degree, frequency, types of testing, etc. of such monitoring shall be established in the approved MACP. The frequency may be modified as approved by EPA in amendments to the MACP.

### **3.1.10 Well Maintenance and Well Abandonment**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

This portion of the MACP shall be completed by the Respondents. EPA plans to incorporate this portion into the MACP upon approving the completion of this work performed by Respondents. The Respondents shall plan for well maintenance for wells which require repair; and proper well abandonment for wells which EPA determines are no longer needed, are no longer usable or serviceable, or must be destroyed for such reasons as redevelopment by the property owner on the property on which the well is located. The MACP shall provide for well maintenance and abandonment to the extent necessary to maintain the effectiveness and completeness of the monitoring well network established in the Monitoring and Compliance Plan (MACP). This section of the MACP shall address standard well maintenance, maintenance frequencies, and standard well abandonment procedures. The detailed well abandonment procedures shall be in accordance with any applicable State of California well abandonment procedures, including but not limited to method of casing destruction, materials (e.g. grout) to be used, introduction method, set times, etc.

## **3.2 Process for Modifying the Monitoring And Aquifer Compliance Plan**

Any changes to the MACP shall be approved by EPA in writing and incorporated into the approved MACP by EPA. Either Respondent may petition EPA to modify the MACP. Alternately, EPA may determine that a change to the MACP is required. In either case, EPA will, at its discretion, make any modifications to the MACP that it deems appropriate and will re-

issue the modified MACP to the Respondents. Upon EPA's modification, the Respondents shall initiate field actions due in accordance with the modified MACP and otherwise in accordance with all other provisions of this SOW.

### **3.3 Field Work for Monitoring**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall implement the field work put forth in the EPA-approved MACP and FSP/QAPP documents as required in the preceding tasks, according to the schedule put forth in the approved UAO Schedule and the approved schedule of completion in the UAO Schedule. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. The Respondents shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the monitoring and compliance activities.

### **3.4 Monitoring and Compliance Reports**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

On a frequency to be established in the approved MACP, the Respondents shall issue Monitoring and Compliance Reports (MACR). Each MACR shall contain the most current and previous data from all monitoring wells in the monitoring well network as well as any wells sampled previously in the remedial design phase. In addition to the data in tabular form, the data shall be interpreted with updated analyses including, at a minimum:

- Results of all new data in an easy to use and understandable format, including any sampling or measurements and in accord with the Data Management Plan for the Remedial Design;
- Groundwater flow directions and gradients (horizontal and vertical);
- Hydraulic and storage properties of the hydrostratigraphic units, if estimates have changed;
- Nature and extent of dissolved and/or free product contamination;
- If new wells were installed during the reporting period and the lithologic data from these wells provides additional relevant information, then graphics shall be provided depicting:
  - locations of sampling points
  - hydrostratigraphic cross sections
  - extent of contamination in each aquifer unit
- Groundwater elevation contours in each aquifer unit; and

- Conclusions on compliance and transgression of the containment zone based on the new data.

The MACR shall include the water quality and water levels measured during the effort both in tabular and graphical format, modified water level hydrographs and contour maps for the various water-bearing units, and reassessments of groundwater flow and gradients.

If requested by EPA, the Respondents shall combine the contents of their respective MACRs into a single report. The report shall provide groundwater elevation contours and contaminant isoconcentration contours for all hydrostratigraphic units, and all other information specified for this task in the preceding paragraphs, for the entire joint site. The Respondents shall modify drafts of the MACR in accordance with EPA comments.

### **3.5 Additional Well Installations for Monitoring and Compliance**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The ROD requires that sufficient numbers of monitoring wells be installed to meet the objectives in the Monitoring and Compliance Plan. If EPA, after consultation with the Respondents, determines that additional monitoring well installations are required to meet the monitoring objectives for the remedial design, then the Respondents shall install any required monitoring wells and conduct necessary sampling by performing the following three tasks.

#### **3.5.1 Work Plan: Additional Well Installations for Monitoring and Compliance**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall develop and submit to EPA a Work Plan for Additional Well Installation and Sampling for Monitoring and Compliance that will meet the stated objectives in EPA's request for additional well installations. At a minimum, this work plan shall include the following major components:

- A description of existing data;
- An identification of the gaps in the current data;
- The identification and rationale for the number and locations of monitoring wells to be installed;
- Identification of the property owners at the locations of the proposed wells and any anticipated issues with short- and long-term property access;

- A complete description, including diagrams, of proposed well construction details and specifications; drilling method and all drilling equipment; all pertinent construction materials; measurements of borehole, casing, and annular space; depths of screened and blank casing; proposed pumps, transducers, and any other dedicated or temporary down-hole equipment; methods to be used to determine depths and elevations; wellhead and well vault construction detail and specifications; and any other related details. Construction diagrams shall be provided relative to the stratigraphy encountered;
- A complete description of proposed well development procedures;
- A complete description of treatment and/or disposal of development water, drilling mud, and any other potentially contaminated media;
- The groundwater sampling procedures and chemical and physical parameters to be included in the sample analyses of the new wells, pending incorporation into the overall monitoring plan;
- A Field Sampling Plan (FSP). This plan shall include the detailed sampling procedures for collecting samples during the well installation and sampling that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. If the Field Sampling Plan for the MACP under Task 3.1.8 has been established and approved by EPA, then EPA may determine that a separate FSP as required in this paragraph is not necessary, and the MACP FSP can then be used for the sampling of the new monitoring wells.
- A Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. If the QAPP for the MACP under Task 3.1.8 has been established and approved by EPA, then EPA may determine that a separate QAPP as required in this paragraph is not necessary, and the MACP QAPP can then be used for the sampling of the new monitoring wells.
- A site-specific health and safety plan shall be prepared with provisions for this work that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 1(1) and (1)(2). A single comprehensive Health and Safety Plan that is inclusive for all Remedial Design may be created, and modified as necessary.
- A schedule of completion shall be submitted to EPA that shall present a list of the major

tasks associated with this data acquisition, along with the start and end dates of each task.

- Any other information necessary to the proper analysis and interpretation of the data collected pursuant to this subtask.

All of the above plans and documents shall be subject to EPA approval. The Respondents shall modify the documents in accordance with EPA comments, if any.

If any of the above item(s) is(are) not applicable to the particular additional well installation work performed, at the Respondents' request EPA may waive the requirement to provide that (those) item(s).

### **3.5.2 Field Work for Additional Monitoring Wells**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall implement the field work put forth in the approved Work Plan and FSP/QAPP according to the schedule put forth in the UAO Schedule. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. If Respondents believe that the schedule will have to change, the Respondents shall contact EPA and request an approval of a change to the schedule of completion. EPA shall then determine whether to approve the requested change. The Respondents shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the monitoring well installation and sampling activities.

### **3.5.3 Completion Report for Additional Monitoring Wells**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall issue a Completion Report for Additional Monitoring Wells documenting the results of the work completed under this task. The Respondents shall modify the draft Completion Report according to EPA comments, if any. The Completion Report shall include:

- Well Completion Documentation, including but not necessarily limited to:
  - Exact well location with coordinates and map relative to surrounding area;
  - Well construction and materials detail;
  - Diagrams of well depths, casing, annular spacing, packing, screened interval;
  - Initial water levels and water quality data;
  - Property ownership and property access issues, including but not limited to permits and easements; and
  - Any other information necessary to document the completion of the wells;

- The objectives of the investigation;
- A description of the field activities documenting actual drilling, and sampling and analysis methods and procedures and how any of these may have differed from the Work Plan for Additional Well Installation;
- Results of any sampling or measurements collected as part of this additional well installation and sampling task;
- Nature of dissolved and/or free product contamination encountered during the well installation;
- Graphics depicting:
  - Locations of sampling points
  - Borehole geophysical logs
  - Hydrostratigraphic cross sections if requested by EPA

### **3.6 Well Maintenance and Well Abandonment Actions**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall perform appropriate well maintenance and proper well abandonment in accordance with the MACP or otherwise approved by EPA in writing. A record of routine well maintenance performed shall be provided in the Monitoring and Compliance Report (MACR) corresponding to the time period in which the work was performed.

In the event that abandonment of a well or wells is determined necessary by the Respondents (or in the case that EPA determines that abandonment of a well or wells is necessary and notifies the Respondents of such determination in writing), the Respondents shall provide EPA with a brief Memorandum documenting the following:

- The specific reason that each well must be abandoned, a list of any alternatives to abandonment that were considered and the reasons such alternatives were not proposed;
- Either a statement that the standard well abandonment procedures in the MACP shall be followed, or a detailed explanation of how the Respondent proposes that the procedures differ from the MACP and why;
- The anticipated schedule for abandonment of each well;
- Traffic control and public protection procedures, if applicable;
- A description of waste handling procedures and sampling to be performed, if any;
- Other pertinent information regarding the specific field activity.

Upon EPA approval of the Memorandum, the Respondents shall abandon the well or wells. Within 30 days of abandonment of the wells, the Respondents shall provide to EPA a Well Abandonment Report (which may be incorporated into the Monitoring and Compliance Report for the reporting period, if approved by EPA) which provides documentation of the field activities performed, dates that work was performed, difficulties or obstacles encountered and how they were addressed, field decisions made, and any other information pertinent to the abandonment of the wells. The Respondents shall modify this report in accordance with EPA comments, if any. The Respondents shall repeat the process of generating a Well Abandonment Plan and Well Abandonment Report as necessary when well abandonment needs arise.

## **4 Preliminary Remedial Design**

The preliminary, intermediate, and final remedial design process is intended to plan for and document all physical and operational elements of the remedial design to be constructed, their dimensions, specifications, costs, schedule, quality assurance, for their construction and operation, and all other factors necessary to:

- Demonstrate that the remedial design will meet the requirements of the ROD and design requirements under CERCLA, the NCP and EPA policy and guidance with respect to remedial design, and comply with all ARARs and pertinent permitting and regulatory requirements;
- Specify to a construction contractor the material, equipment, and performance required to meet the ROD requirements so that contractor can construct the remedial system;
- Document the design to set the stage for the subsequent remedial action phase;
- Document the physical and operational aspects of the design for EPA, other agencies, and the public such that the design can be appropriately assessed and tracked, and such that EPA can hold informed dialogue with such parties and receive comments on the remedial design.

The preliminary remedial design is intended to advance to the 30% design level. The intermediate remedial design is intended to advance to the 75% design level. The pre-final design is intended to advance to the 90% design. The final design is intended to be the 100% design. This task addresses the preliminary design.

EPA will review the preliminary design documents prior to completion of the draft documents by the Respondents per this SOW. If EPA's comments are adequately addressed, EPA will provide notification of acceptance of the preliminary design step. The intermediate design step shall then be undertaken as put forth in Task 5 of this SOW, and in accordance with the UAO Schedule. At its discretion, EPA may give approval to the Respondents to proceed with intermediate design in advance of EPA's final acceptance of the Preliminary Design documents. If approved by EPA, the Respondents may combine some of the deliverables listed under the preliminary remedial design SOW. When all the preliminary design deliverables are completed, the Respondent shall

bind them together in a single Preliminary Design Compendium which will make it easier for the public to follow the remedial design process.

## 4.1 Preliminary Design Criteria Report

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall develop and submit to EPA a Design Criteria Report that defines in detail the technical parameters upon which the design will be based. The Respondents shall modify the Design Criteria Report according to EPA comments, if any. Specifically, the Design Criteria Report shall include the preliminary design assumptions and parameters, including but not necessarily limited to:

- Volume and volumetric flow rate of groundwater requiring treatment, including concentrations of contaminants to be treated and other constituents in groundwater that may affect the treatment process; examples are:
  - Volume of groundwater to be treated;
  - Volumetric flow rates of groundwater to be treated;
  - Temperatures of groundwater requiring treatment;
  - Concentrations of contaminants in groundwater to be treated;
  - Concentrations of other chemicals in groundwater that affect the treatment process and therefore also require treatment;
  - Mass flow rates of groundwater to be treated;
  - Mass flow rates of each contaminant requiring treatment;
  - Mass flow rates of each chemical affecting treatment;
- Pretreatment requirements, if necessary;
- Treatment scheme including description of rates and byproduct generation;
- ROD requirements for effluent limits and/or treatment requirements;
- ARAR requirements;
- Substantive requirements of permits;
- Pertinent building, fire, electrical, plumbing, municipal codes and standards required by local building departments;
- The design effluent volumetric flow rates;
- Design life of the system;

- Identify the expected long-term process monitoring and operations and maintenance (O&M) requirements; for example, items such as access to equipment, instruments, devices, operator, head clearance, etc. that will be addressed in the design;
- Technical factors of importance to the design and construction including use of currently accepted environmental control measures; and
- Constructability of the design, and use of currently acceptable construction practices and techniques.

As previously specified, the preliminary design criteria shall address all aspects of the overall operational design.

## 4.2 Preliminary Basis of Design Report

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall prepare and submit a Basis of Design Report that includes the conceptual design elements necessary to achieve the Design Criteria listed in the Design Criteria Report: The Basis of Design Report shall include but not necessarily be limited to:

- A preliminary process and instrumentation diagram;
- Process equipment data sheets and lists;
- Pumps and blowers data sheets and lists;
- Valves and valve types;
- Piping schedule;
- Measurement instruments (flow meters, pressure gauges, etc.);
- Flow stream identification;
- Mass flux into each unit process of each medium;
- Mass flux into each unit process of each chemical being treated;
- Heat or energy flux into each process unit and its form (e.g., electricity, mechanical work, heat);
- Mass flux out of each unit process of each medium;
- Mass flux out of each unit process of each chemical being treated;
- Heat or energy flux out of each process unit and its form;
- A detailed description of the evaluations conducted to select the design approach as part of the Basis of Design Report;

- A list of any assumptions being used;
- Calculations supporting the assumptions;
- Detailed equipment list that includes equipment capacity, corresponding power and voltage, VFD requirement, number of duty units, number of redundant units, proposed manufacturers, and model numbers;
- Preferred voltages for power distribution and utilization equipment;
- Standby power requirements and preliminary size;
- Redundancy requirements for power supply and power distribution;
- Indoor versus outdoor electrical equipment location and enclosure requirements;
- Soils information for structural design and preliminary foundation recommendation;
- Equipment and instrument tag numbering, naming and abbreviation conventions;
- Control system block diagrams and configuration;
- Site grading plan, including the surveying and topographic map.(existing 1-foot contours) roads, property lines, easements;
- Preliminary site layout showing existing and proposed well locations and proposed treatment system location;
- Well design planning and supporting details to define well construction, including well completion diagram for each well; depth to bottom of well and screen; depth to top of screen, sand pack, seal, grout, well casing and borehole diameters, surface valve and pipe connection details and completion details;
- Availability of potable water, storm and sewer utilities near the treatment system;
- Summer/winter ambient temperature and wind velocity design criteria;
- A list of each ARAR identified in the ROD and how it is being met by the proposed design;
- A list of each substantive requirement for a permit and how it is being met by the proposed design;
- The design mass flow rate of groundwater and the chemical in that medium; and
- A list of all environmental and public impacts and how they are being mitigated by the design or will be mitigated by operational controls.

### **4.3 Preliminary Specifications Outline**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall prepare a Preliminary Specifications Outline to include all specification sections to be used in the design. The Respondents shall modify the Specifications Outline in accordance with EPA comments, if any. The format and organization of the specifications shall be presented as described in Chapter 10 of the Architect Engineer Manual, USACE, AEIM-14, Omaha District, July 1989, which incorporates the Construction Specification Institute (CSI) format, or later latest version of this document as applicable. Any deviations from this standard shall be approved by EPA in advance.

### **4.4 Preliminary Project Delivery Strategy and Construction Schedule**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall develop and submit to EPA a Preliminary Project Delivery Strategy and Construction Schedule that is appropriate to the size and complexity of the project. The schedule shall also contain preliminary strategies for accomplishing all activities on the schedule, identification of likely issues or barriers to progress, etc. The Respondents shall modify the Project Delivery Strategy and Schedule according to EPA comments, if any.

### **4.5 Preliminary Drawings**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall prepare and submit to EPA a preliminary set of drawings and schematics for the remedial system. The drawings shall reflect organization and clarity. This submittal shall include: (1) an outline or listing of proposed drawings and schematics; (2) facility representations including a preliminary process and instrumentation diagram; (3) a general arrangement diagram; and (4) site drawings. Engineering drawings shall be submitted in full-size and half-size reproductions. Standard formats for use in preparing design drawings shall be those described in the USACE Architect Engineer Manual, or by another format as approved by EPA in advance. The Respondents shall modify this submittal in accordance with EPA comments, if any.

## **4.6 Preliminary Cost Estimate**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall prepare and submit to EPA a Preliminary Remedial Action Cost Estimate incorporating the expected costs of all the elements of the remedial action. The estimate shall be prepared in accordance with the guidelines of the International Association for the Advancement of Cost Engineering (AACE) Class 3 estimate. The Respondents shall modify the cost estimate according to EPA comments, if any.

## **4.7 Amendment to Preliminary Analysis of Pipeline Corridors and Easement, Access, and Permitting Requirements**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall prepare and submit to EPA a Preliminary Analysis of Pipeline Corridors and Easement, Access, and Permitting Requirements [for Respondent Montrose, this will be an amendment to the report with the same name completed under the Initial Remedial Design; Respondent Montrose shall update and expand the report]. In this analysis the Respondents shall develop and evaluate various options for placement of pipeline corridors as needed to construct the optimized well field. The analysis shall also identify in advance any issues with respect to easements, access requirements, and permitting requirements that may apply to construction of the portions of the remedial system that lie outside the boundaries of the Montrose plant property including but limited to extraction and injection wells and water conveyance structures. In the analysis, the Respondents shall identify for each potential pipeline corridor such factors as:

- Property ownership and current use;
- Applicable agencies with jurisdiction in the matter;
- Potential future uses of the property;
- Easements and legal encumbrances; and permitting and other regulatory restrictions;
- Physical access restrictions;
- Access to needed facilities such as water, power, or sewer disposal during construction or remedial action;
- Potential for interference with community or business activities, and/or proximity to residential areas posed by any given pipeline alignment;
- The type (e.g. single vs. double-barrel) and material of pipe to be used for conveyances, as well as discuss the basis and/or criteria being used to evaluate the options.

- Any other matters and evaluations as may be necessary to present a thorough analysis of specifically located pipeline corridors, and options for those corridors, and develop materials sufficient for EPA to present such options to the public.

The revised analysis shall allow for a prime pipeline corridor network and two practicable alternate corridor networks. The analysis shall update all the factors discussed in the original preliminary pipeline corridor analysis, as well as discuss the basis and/or criteria being used to evaluate the options.

## 5 Intermediate Remedial Design

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The preliminary, intermediate, and final remedial design process is intended to present all elements of the remedial design to be constructed, their dimensions, their specifications, the requirements for their construction and operation, and all other elements necessary to:

- Demonstrate that the remedial design will meet the requirements of the ROD;
- Specify to a construction contractor the material, equipment, and performance required to meet the ROD requirements so that contractor can construct the remedial system.
- Document the design to set the stage for the subsequent remedial action phase;
- Document the physical and operational aspects of the design for EPA, other agencies, and the public such that the design can be appropriately assessed and tracked, and such that EPA can hold informed dialogue with such parties and receive comments on the remedial design.

The intermediate remedial design is intended to advance to the 75% design level (an exception to this is described under Procedure B, below). This task provides requirements for the intermediate design phase. Upon acceptance of the preliminary design by EPA, the Respondents shall initiate work per the UAO Schedule to complete the intermediate design in accordance with this task. All plans and specifications shall conform to standards acceptable to EPA and shall be formatted in accordance with CSI requirements, unless otherwise agreed in writing by EPA.

If approved by EPA, the Respondents may combine some of the deliverables listed under the intermediate remedial design SOW. When all the intermediate design deliverables are completed, the Respondents shall bind them together in a single Intermediate Design Compendium which will make it easier for the public to follow the remedial design process.

## **General Requirements for Intermediate Remedial Design**

### **Procedures A and B**

The intermediate remedial design may take place under one of two procedures, or courses. Intermediate design shall proceed initially pursuant to Procedure A as defined herein. Procedure B shall only apply if it is invoked by EPA due to deficiencies in the work of the Respondents, as described below.

**Procedure A.** Procedure A is intended to require less time to complete overall, create fewer breaks in work for reviews of intermediate deliverables, and allow more continuous "working" revision of design documents, as compared with Procedure B.

Under Procedure A, intermediate design shall culminate at the 75% design level. A formal and self-contained "Intermediate Design Report" will not be required of the Respondents. Rather, the Respondents shall produce a series of interim drawings, specifications, and sub-deliverables, as discussed in this task. These shall be prepared at varying times in accordance with the UAO Schedule. The interim documents will be reviewed by EPA and modified/advanced by the Respondents in continuous fashion while the intermediate design work steadily proceeds. After these working revisions are completed, the Respondents shall assemble the revised drawings and specifications into a 75-percent set, which will serve as the basis for the preparation of the Pre-Final (or 90-percent) Design Report as put forth later in this SOW.

Under Procedure A, frequent meetings and communication between EPA and Respondents shall be required. This will ensure that EPA has appropriate and effective oversight of the intermediate design process throughout, and that EPA's comments are addressed in the design elements as they are developed.

The Respondents shall attend and demonstrate the progress of design to EPA in three ***Intermediate Remedial Design Progress Meetings***. The meetings shall be scheduled by EPA. At present, EPA plans to schedule the meetings approximately 2-3 months apart. EPA may require more frequent meetings as it deems necessary, or may require additional meetings if the schedule for intermediate design is extended by EPA. In such instances, the Respondents shall attend these meetings as required by EPA.

At least two weeks prior to each design progress meeting, the Respondents shall submit the interim draft drawing and specification materials specified by this task for each meeting (hereafter, "interim materials"). At each meeting, EPA and the Respondents shall meet, assess progress, review the interim materials and discuss, adjust approaches, and/or establish necessary changes to the interim materials. After the meeting, EPA will issue written comments, if any, on

the interim materials. EPA may require that the Respondents issue a response to comments memorandum to explain changes made to the interim materials, where necessary to understand the changes.

Unless another schedule is approved by EPA, the Respondents shall, two weeks prior to the next progress meeting, address any outstanding EPA comments on the interim materials presented at previous progress meetings, and provide the interim materials required for the upcoming meeting.

EPA may at its discretion waive the requirement for an in-person meeting and comment on the interim materials submitted by the Respondents without the meeting.

Unless otherwise specified by EPA in writing, work by the Respondents on the interim remedial design may proceed without waiting for EPA approval of requested modifications. EPA may, however, require a hiatus in the work if it determines that it is unable to adequately monitor the intermediate design to ensure a sound final design.

**Procedure B.** If EPA determines that the Respondents are:

- Not attending the design progress meetings in good faith,
- Producing inadequate interim materials as required by this Task;
- Unacceptably late in developing the materials or meeting requirements;
- Not responding adequately to EPA's comments on the interim materials,
- Failing to demonstrate sufficient progress toward a remedial design that will be acceptable to EPA; or
- Proceeding in a manner that does not allow for EPA to oversee the intermediate design work and verify its content;

then EPA may, by letter to the Respondents, invoke Procedure B for the intermediate design. In such a case, a formal and complete 60% (*not* 75%) Intermediate Design Report shall be produced by the Respondents, in accordance with the UAO Schedule, and shall be subject to EPA review and approval, prior to proceeding with the Pre-Final Design. All interim materials shall be formalized at the 60% design level specified by EPA, and shall be included within the context of the fully developed Intermediate Design Report. If Schedule B is invoked, EPA will amend the UAO Schedule to remove the interim design meetings and interim materials and establish the schedule for the Interim Design Report. Should Procedure B be invoked, EPA plans to consult with the Respondents prior to finalizing changes in the UAO schedule.

**Constructability, Biddability and Operability Evaluations Intrinsic to Design.** Throughout the intermediate design process, the Respondents shall make evaluations to ensure that the emerging design will be constructible, biddable and operable. This is critical to ensure that the remedial design process does not proceed to completion only to find, for example, that it cannot in reality be constructed or that no vendor would be available who could build it. This analysis is generally intrinsic to any remedial design effort. Without writing a formal and separate report

for each such analysis, the Respondents shall discuss the progress and results of the analysis with EPA in the interim meetings (under Procedure A) or within the Intermediate Design Report (under Procedure B) and this analysis shall be considered an integral part of the design. The results of such analysis should be apparent in the Final Design Report.

## **5.1 Intermediate Design Drawings and Specifications**

The Respondents shall provide drafts of these drawings and specifications in phases of their development as set forth below.

### **5.1.1 Drawings and Specifications for Intermediate Remedial Design Progress Meeting 1**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned only to one respondent by the text below.*

Prior to Interim Remedial Design Progress Meeting 1, the Respondents shall:

- Provide a technical memorandum describing changes that may impact the design criteria shown in the Preliminary Design Report;
- Update selected pipeline corridor routing to address comments from stakeholders and other concerns that may arise during the intermediate design;
- Well design planning and supporting details to define well construction, including well completion diagram for each well; depth to bottom of well and screen; depth to top of screen, sand pack, seal, grout, well casing and borehole diameters, surface valve and pipe connection details and completion details;
- Updated site layout, including roads and location and identification of existing utilities and their sizes, existing and proposed well locations, and proposed treatment system location;
- Updated site grading plan, including the surveying and topographic map (existing 1-foot contours); existing and proposed 1-foot contours), roads, property lines, easements, extent of pavement and pavement design;
- Structural plans and section for major structures (with wall and foundation thicknesses);
- Mechanical equipment, piping layouts and basic sections. Piping layouts and specifications shall include valves and instruments;
- Updated process and instrumentation diagrams (to include control signals, tag numbering, equipment names, instrument/control panels voltage requirements, etc.);
- Electrical one line diagrams;

- Preliminary control loop descriptions, instrument schedule, real input/output list, pipe and valve schedules;
- Drawings and specifications for conveyances;
- Preliminary equipment specification sections; and
- Revised list of specification sections.

### **5.1.2 Drawings and Specifications for Intermediate Remedial Design Progress Meeting 2**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The drawings and specifications that the Respondents shall provide prior to Intermediate Remedial Design Progress Meeting 2 shall include:

- An updated list of changes that significantly impact the design progress;
- Modified and advanced drawings and specifications for conveyances and any additional analysis on pipeline corridors;
- Updated site layout, including elevations and horizontal locations for all structures; access roads with centerlines and curbs, slopes and curbs; fence; pavement limits; electrical transformers; and site lighting;
- Yard piping drawings showing pipes 4 inches and larger;
- Updated site grading plan to include proposed grading (using 1-foot contours), drainage swales and pipes;
- Updated structural plans and sections showing thickness and rebar for concrete structures and foundations as well as member sizes and anchoring requirements for steel structures;
- All well drawings and mechanical equipment and piping layouts and sections – this must include callouts to identify pipe size and flow stream identification, valves, equipment names and tag numbers, instrument tag numbers, dimensions, details, and support utilities, conductor casing details and additional seal/screen/sand pack details;
- Complete process and instrumentation diagrams and control system block diagram (100%);
- Preliminary control diagrams for each type of control scheme required;
- Initial one-line diagrams, electrical equipment layout(s), electrical power plan(s), motor control schematics, load calculations and harmonic study;

- Control system, control loop, control panels, and instruments specification sections;
- Updated drawings and specifications for conveyances; and
- All specification sections in Design Divisions 2, 3, 5, 11, 13 and 15 applicable to the design.

### **5.1.3 Drawings and Specifications for Intermediate Remedial Design Progress Meeting 3**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The information the Respondents shall provide prior to Intermediate Remedial Design Progress Meeting 3 shall include, but not be limited to:

- Updated (to 75%) list of changes that significantly impact the design progress;
- Updated (to 75%) general drawings, including a drawing index, abbreviations, legends for all disciplines, design criteria, cover sheet showing the site location relative to the State of California, relative to the greater Los Angeles Metropolitan Area and relative to the City within an 8 to 16 square block area.
- Updated (to 75%) complete site layout, including all civil details;
- Updated (to 75%) yard piping drawings, including yard piping details;
- Updated (to 75%) site grading drawings, including all grading details;
- Updated (to 75%) structural drawings, including all structural details;
- Updated (to 75%) mechanical drawings, including all mechanical details;
- Updated (to 75%) control system block diagram, including all instrumentation and control details;
- Updated (to 75%) electrical drawings, including all electrical details;
- Updated (to 75%) specifications and drawings for conveyances; and
- Updated (to 75%) specification sections for Divisions 1, 2, 3, 5, 7, 9, 11, 13, 15 and 16.

Upon acceptance of all revisions to the intermediate design drawings and specifications by EPA, the Respondents shall produce a Pre-Final (90 percent) Design Report as described in Task 6 of this SOW.

## 5.2 Revised Remedial Action Cost Estimate

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall modify and update the preliminary remedial action cost estimate. Engineer's cost estimate for the remedial action, including both construction and capital costs, and expected operation and maintenance costs, based on the more refined details of the intermediate design. The estimate shall be prepared in accordance with the guidelines of the AACE International, (the Association for the Advancement of Cost engineering) Class 2 estimate. The Respondents shall submit the Intermediate Remedial Action Cost Estimate to EPA, and shall modify it according to EPA comments, if any. This cost estimate shall be issued as a separate document from the Intermediate Design Report by the Respondents.

## 6 Final Remedial Design Report

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

Upon acceptance of all revisions to the intermediate design drawings and specifications by EPA, the Respondents shall produce a Pre-Final (90%) Design Report as described in the next section of this SOW. The Pre-Final Design Report, consisting of Drawings and Specifications completed to the 90% design level, shall be submitted to EPA for review. The Respondents shall produce the Final Design Report in accordance with EPA's comments and after adding all information to complete the design at the 100% level. The Pre-Final Design Report shall at a minimum include:

- Complete general drawings, including a drawing index, abbreviations, legends for all disciplines, design criteria, cover sheet showing the site location relative to the State of California, relative to the greater Los Angeles Metropolitan Area and relative to the City within an 8 to 16 square block area.
- Complete site layout, including all civil details;
- Complete yard piping drawings, including all yard piping details;
- Complete site grading drawings, including all grading details;
- Complete structural drawings, including all structural details;
- Complete mechanical drawings, including all mechanical details;
- Complete process and instrumentation diagrams, control system block diagram, including all

instrumentation and control details;

- Complete electrical drawings, including all electrical details;
- Complete drawings and specifications for conveyances; and
- Complete specification sections for Divisions 1, 2, 3, 5, 7, 9, 11, 13, 15 and 16.

The pre-final and final design plans and specifications must be consistent with the technical requirements of all ARARs selected in the ROD and with all ROD requirements, standards, and specifications. Any offsite disposal of hazardous materials shall be in compliance with the policies stated in the Procedure for Planning and Implementing Offsite Response Actions (Federal Register, Volume 50, Number 214, November 1985, pages 45,933–45,937) and other applicable guidance.

The final submittals shall include a complete set of construction drawings and specifications as well as a set of half-size reductions of drawings. All specifications shall conform to CSI format.

An engineer's cost estimate for construction, long-term operation, maintenance of the remedy and long term groundwater monitoring shall be produced. The estimate shall be prepared in accordance with the guidelines of the AACE International, (the Association for the Advancement of Cost engineering) Class 1 estimate. This cost estimate shall be submitted to EPA in the form of a technical memorandum at the same time as the final design documents.

The final design report shall be stamped by a certified and credentialed professional engineer in good standing within the State of California. These documents shall be intended for use as contract documents and shall meet substantive requirements for all building, fire, electrical, mechanical, or other permits required by federal, state, or local agencies prior to construction of the remedy.

Final plans and specifications shall address construction, installation, site preparation, and field work standards, and all aspects of design necessary to construct the remedial action. A table of contents for the general specifications shall be provided with this submittal.

The Final Design Report shall, as with all work under this SOW, be subject to EPA review and approval.

## **7 Preliminary Operation and Maintenance Manual**

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The Respondents shall produce a preliminary Operations and Maintenance (O&M) Manual. All of the requirements in Section 13, Provision 15.02 of the ROD shall be addressed; the required plans listed in Section 13, Provision 15.03 of the ROD shall be included; and the following shall be incorporated and documented, at a minimum:

- A description of normal O&M including startup procedures, tasks for operation, tasks for maintenance, prescribed treatment or operation conditions, and schedule for each O&M tasks;
- A description for the pipeline and well system maintenance procedures and their frequency;
- A description of potential operating problems including common and/or anticipated remedies and useful-life analysis of significant components and replacement costs; Complete discussion and outline of all procedures, methods, approaches, protocols necessary to verify compliance with all ARARs and ROD requirements for the treatment system;
- A Quality Assurance Project Plan (required under ROD, Section 13, Provision 15.03) for O&M including a description of routine monitoring tasks, description of required laboratory tests and their interpretation, required data collection, and location of monitoring points to be used for compliance monitoring -- this monitoring refers to the sampling of influent and effluent to the treatment system, or emissions from the system;
- Procedures for assessing system maintenance needs (including both the treatment and the conveyance system), and system compliance with discharge and other standards;
- Alternate procedures to prevent releases or threatened releases of hazardous substances, pollutants, or contaminants, which may endanger health and the environment or cause an exceedance of any cleanup standard;
- A list and description of corrective actions to be implemented in the event that cleanup standards for groundwater, surface water discharges, and air emissions are exceeded and a schedule for implementing these corrective actions;
- A complete description of shutdown systems, alarms and monitoring of systems to be followed while system is in operation to ensure that there is no violation of ARARs or other ROD requirements for the system at any time; provisions for shutdown shall be fully described such that personnel on site are aware of what to do in the event of an emergency or release of hazardous substances and how to shut the system down safely;
- A complete list of agencies to be informed in the event of various types of incidents, from routine measurements to emergencies;
- A Safety Plan for O&M (required under ROD, Section 13, Provision 15.03) including a description of precautions and necessary equipment for site personnel, safety tasks required in event of systems failure, and safety tasks necessary to address protection of nearby residents;
- A description of equipment including the equipment identification numbers, installation of monitoring components, maintenance of site equipment, and replacement schedule for equipment and installed components; and
- A list and discussion of records and reporting mechanisms required including daily operating logs, laboratory records, records for operating costs, mechanism for reporting emergencies,

personnel and maintenance records, and reports to EPA, its designates, and the State.

The O&M Manual should be finalized during the remedial action phase. The final O&M manual shall include the operations and maintenance manuals provided by manufacturers for each individual piece of equipment and system used for the remedial action. It is understood that the latter information will only be available after the equipment submittals have been approved. The inclusion of the individual O&M information for each piece of equipment/system into the final O&M Manual shall be properly referenced and arranged in a logical manner.

## 8 Continuing Well Surveys

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

The ROD (Section 13 Provisions 4.03 and 16.030), requires that well surveys be performed to monitor groundwater use within the areas where groundwater is affected or may become affected by contamination originating from the Joint Site. The minimum areas of the surveys are specified in the ROD. These well surveys shall identify all currently existing public, private, industrial, or irrigation water supply wells on file with the water master regardless of whether or not they are in operation at the time of the survey.

By means of its existing work, and additional work as necessary or required by EPA, each Respondent shall produce a Production Well Survey Report, which shall include the following:

- Records from the local watermaster, including records, applications, registrations, and permits pertaining to wells that have been or will be installed in the area of concern. Well construction details, 5-year well pumping histories and rates, 5-year water level histories, and 5-year water quality data shall be obtained wherever possible.
- All water purveyors in the area shall be surveyed and a determination will be made whether any new water production or injection wells have been or are being installed in the area, and whether there are any plans or intentions to install such wells in the next five years. Purveyors shall include but not necessarily be limited to The City of Torrance Municipal Water Department, the Southern California Water Company, the Dominguez Water Corporation, the Central- and West-Basin Municipal Water Districts, and the Central- and West-Basin Water Replenishment Districts. Well construction details, 5-year well pumping histories and rates, 5-year water level histories, and 5-year water quality data shall be obtained wherever possible.
- An updated map of all well locations within the area of concern, with tabular references to well construction information, well status, well production rates, water level histories, and water quality data shall be presented in the report.

One or more scaled figures, annotated as necessary, allowing EPA to ascertain the relative distance between the distributions of pCBSA, benzene and chlorobenzene in groundwater and

the water supply wells identified in the survey, shall be provided.

## 9 Community Involvement Assistance

*Each of the Respondents shall be individually responsible for performing its own version of the work under this task, unless the work is specifically assigned to one respondent by the text below.*

EPA shall be the executor of community involvement and media relations activities related to work conducted under this SOW. However, only upon request from EPA, the Respondents shall provide assistance to EPA on such activities. EPA anticipates significant public interest in the pipeline corridors that will be part of the design. It is anticipated that many such corridors will lie in County or City streets in front of residences or businesses. Therefore, the location, alignment, construction, and specifications of the pipelines will be of heightened concern if for no other reason than direct proximity. Also of interest will be the treatment systems themselves and possible treatment system locations.

The Respondents shall provide the following types of assistance under this task, as requested by EPA:

- Technical information and documents regarding possible treatment systems, components, and conveyances (pipelines), potentially including but not limited to graphics, tables, maps, memoranda, reports, specifications, correspondence, permits and applications, computer files, work schedules, work procedures, maintenance and security plans, and traffic plans.
- During field work, providing basic information to concerned residents and also referring such persons to EPA for more information;
- Only upon EPA's request, writing flyers to disseminate information to residents in the vicinity of planned field work; EPA shall have approval authority over such flyers and EPA approval shall be obtained prior to their public distribution;
- Providing EPA with property and property access information;
- Supporting EPA in writing portions of outreach materials or attachments to such materials.

## LIST OF MAJOR DELIVERABLES

*Only major deliverables are shown. This table is for convenience, the SOW text above shall be definitive in terms of actual deliverables. EPA work items are not listed in this table. Some of the deliverables in the table are contingent and may not be required pending EPA determinations (see scope).*

<b>Responsibility</b>	<b>Deliverable</b>
Montrose/Shell	Modified Data Management Plan
Montrose	Supplemental Work Plan for Data Acquisition
Shell	Supplemental Work Plan for Data Acquisition
Montrose/Shell	FSP, QAPP, and Health and Safety Plans for Data Acquisition
Montrose/Shell	Supplemental Report(s) for Data Acquisition (report for each work plan executed unless EPA approves combining)
Montrose/Shell	Supplemental Compilation and Update of Other Sources of Groundwater Information
Montrose	Supplemental Work Plan for Pilot Extraction, Injection and Aquifer Response Test
Montrose	Supplemental Completion Report for Pilot Extraction, Injection, and Aquifer Response Test
Montrose/Shell	MACP: Field Sampling Plan and Quality Assurance Project Plan
Shell	MACP: Plan for Direct Monitoring of Intrinsic Biodegradation
Montrose/Shell	MACP: Plan for Well Maintenance and Abandonment
Montrose/Shell	Monitoring and Compliance Reports
Montrose/Shell	Work Plan, Field Sampling Plan, and Quality Assurance Project Plan for Installation and Sampling of Additional Monitoring Wells
Montrose/Shell	Well Maintenance and Abandonment Completion Reports
Montrose/Shell	Preliminary Design Criteria Report
Montrose/Shell	Preliminary Basis of Design Report
Montrose/Shell	Preliminary Specifications Outline
Montrose/Shell	Preliminary Project Delivery Strategy
Montrose/Shell	Preliminary Drawings
Montrose	Revised Preliminary Pipeline Corridor, Easement, Access, and Permit Requirement Report
Shell	Preliminary Pipeline Corridor, Easement, Access, and Permit Requirement Report
Montrose/Shell	Materials for Meetings 1, 2 and 3 (See SOW text, above)
Montrose/Shell	Final Design Report
Montrose/Shell	Continuing Well Survey Reports

### Primary Revisions to Order

Paragraph	Amendment
Caption page, 6, 23, O	References to "Shell Oil Company, Inc." and "Shell Chemical Company" have been changed to "Shell Oil Company."
8	The concentration of benzene in groundwater has been updated.
10	The phrase "unless it is removed or destroyed" was removed in reference to DNAPL at the Site.
13	The comparison of contaminants to MCLs has been corrected.
56	The notice period prior to field work has been changed to be consistent with the requirement of the SOW.
74	Two commas were added to clarify the intent of the financial assurances requirement, per Montrose's request.
86-87	The history of order issuance and Respondents' opportunity to confer has been summarized. Respondents will have no further opportunity to confer.
90	The lag time before the effective date has been eliminated, as Respondents have already had an opportunity to confer.

### Primary Revisions to the Statement of Work

<b>COMMENT DESCRIPTION</b>	<b><u>NOTES ON CHANGES TO THE STATEMENT OF WORK</u></b>
	This table is for explanation and discussion purposes only. The language used here carries no authority with respect to the requirements under the Order or the SOW.
Contingency Work under Previous Orders	<p>Language has been added to the SOW to clarify that work presently underway under the Initial Design Order will be completed under that Order; and that EPA does not presently anticipate specific work being necessary under Task 1.</p> <p>An additional change has been made to Task 1.1, which contains the contingent TCE, benzene, pCBSA data acquisition. This section has been shortened to provide for a single Supplemental Data Acquisition Work Plan for any such work, rather than separate work plans for particular contaminants. Some objectives have been assigned to one party only; for instance, pCBSA is assigned to Montrose, and benzene to Shell. This simplifies the provision for the contingent work and may reduce the time and costs associated with it should it become necessary.</p>
Mischaracterization of MCB Concentrations in Excess of MCL	Language in the SOW has been modified to address this.
Field Work Advance Notice Requirement	The discrepancy between Order and SOW has been corrected and set to 7 days, as Montrose suggested.
Design Reviews	The Design Review Task has been deleted from the SOW. Language has been added to the Intermediate Design Task requiring the Respondents to consider biddability, constructability and operability within the general context of the overall design effort.
Wellfield for Starting Point of Remedial Design	The SOW has not been modified directly. However, before the original Order (2009-04) was issued, EPA had already provided the interim well field tables and pump rates to Montrose and EPA has now issued the Overall Operational Design document. EPA considers the design work fully started as of the Effective Date of the Order.
Revisions to the Groundwater Model ("EPA Modeling")	The SOW has not been modified directly, but the following clarification may be useful, EPA does not intend to make wholesale changes in the way the model is constructed in the midst of formal design. That work has been completed. However, where appropriate, the model should be used as an available tool to address design issues and needs. It has been recognized from the outset of model development that one of the powerful benefits of a PEST-based model is the ability to recalibrate it automatically and quickly based on new data and information. Such information could be, for instance, monitoring data, changes in water levels due to new pumping, or aquifer response data from early operation of the treatment system itself. The model can also be used to evaluate

	<p>"what-if" scenarios and other decisions that need to be made during the design process. Such recalibration and application is not a "change" to the model as constructed but rather the adjustment and utilization of the model to accommodate new conditions, situations, or questions.</p>
Early Completion of a Predecessor Task	<p>Section 4.4.5 in the original SOW has been deleted in its entirety.</p>
Notice of Deficiencies and Stop Work Orders	<p>It is acknowledged that such notices may apply to only one party in a given instance. The SOW has been modified to reflect that EPA may issue such notices to one party or to both parties, as appropriate.</p>
Missing Workplan Specification	<p>This comment has been addressed within the context of a larger modification to the SOW. As discussed above, Task 1.1, which contains the contingent TCE, benzene, pCBSA data acquisition, has been shortened to provide for a single Supplemental Data Acquisition Work Plan for any such work, rather than separate work plans for particular contaminants. Some objectives have been assigned to one party only; for instance, pCBSA is assigned to Montrose, and benzene to Shell. This simplifies the provision for the contingent work and may reduce the time and costs associated with it should it become necessary.</p>
Pilot Testing Fieldwork	<p>The SOW has been modified to address this comment.</p>
Respondent Tasks Regarding Modeling	<p>Modifications to the SOW are not necessary. The comment is noted. EPA has issued the Overall Operational Design and is open to Respondent comment. EPA will do so as well for the Model Development and Wellfield Optimization Report.</p>
Pore Volume Flushing	<p>Modifications to the SOW are not necessary. The comment is noted. We believe that Montrose and EPA have a common understanding on this issue; regardless, this can be addressed within the context of the MACP.</p>
Potential for Additional Monitoring Wells	<p>The SOW has not been modified. While it is true that monitoring wells necessary for compliance monitoring may not be needed until the remedial action is underway, this is not a given. This SOW provision allows for the installation of the wells should compliance monitoring be necessary during the design period and/or before entry of a remedial action consent decree.</p>
Completion Report for Additional Monitoring Wells	<p>The SOW has been modified accordingly.</p>
Comments Related to 75% versus 60% Design	<p>EPA included three interim meetings as part of the intermediate design, in lieu of a 60% design report, in direct response to a request by Montrose. Montrose presented this idea to EPA more than a 18 months ago in order to minimize the cost and amount of time necessary to generate a formal 60% design report. EPA concurred with this idea, provided EPA had sufficient ability to oversee the progress of the design</p>

	<p>and have input before the design gets too far along. In the interim meeting approach, EPA must work quickly to review what are essentially "living" documents – drawings, specifications and such at key points in the process. EPA was concerned that, if a complete and formal 60% design deliverable would not be available, there would be too much design development between 60% and 100% that EPA would not be able to oversee. Also, given the content of the three meetings, it made sense to extend the end of the Intermediate Design to 75%.</p> <p>The SOW has not been modified. However, if Montrose is now more comfortable with returning to a full and formal 60% design deliverable, we can discuss with Montrose using Procedure B rather than Procedure A at the outset.</p>
Preliminary Design Acceptance	The SOW has been modified to indicate that EPA may, at its discretion, approve the initiation of the Intermediate Design without EPA's final approval of the Preliminary Design Deliverables.
Intermediate Design Deliverable - Binding Together	Montrose's stated understanding of the requirement appears to coincide with ours. No changes to the SOW are necessary.
General Requirements of Remedial Design - Design Hiatus	The SOW has not been modified. EPA will make reasonable effort within its available resources to oversee the design work in a timely manner. While EPA understands the issues that may arise with a hiatus and will seek to avoid such occurrences, EPA must be able to oversee the work to ensure that the design will be acceptable.
Intermediate Remedial Design Meeting 1	This comment was not clear. At a later date, EPA would be willing to further discuss Montrose's concern so as to clarify the expectations.
Pipeline Corridor Analysis	Minor changes have been made to the SOW to address this concern; further clarifying discussion can take place between the parties as necessary at a later date.
Intermediate Remedial Design Meeting 2	Changes to the SOW are not necessary, but further clarifying discussions between EPA and the Respondents can take place as necessary at a later date.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105

May 6, 2008

VIA NEXT-DAY MAIL

Mr. Joe Kelly, President  
Montrose Chemical Corporation  
600 Ericksen Avenue NE  
Bainbridge Island, WA 98110

Mr. George Landreth  
Shell Oil Company  
OSP 17708  
910 Louisiana Street  
Houston, TX 77002

RE: Transmittal of Amended Administrative Order for Dual Site Groundwater Remedial Design; Dual Site Groundwater Operable Unit; Montrose Chemical and Del Amo Superfund Sites; Los Angeles County, California

Dear Messrs. Kelly and Landreth:

On February 20, 2008, EPA issued Administrative Order No. 2008-04 ("Order") to Montrose Chemical Corporation ("Montrose") and Shell Oil Company ("Shell") as Respondents. At their request, Respondents met with EPA to discuss the Order on March 12, 2008. In the meeting the Respondents conveyed their concerns about the Order and the SOW, and subsequently documented those concerns in written comments.

After considering the Respondents' comments, EPA is issuing Amended Administrative Order No. 2008-04A to Montrose and Shell with this letter. The Amended Order is effective as of the date of execution. For your convenience, attached to this letter are tables that describe the primary changes to the Order and Statement of Work as reflected in the Amended Order. Additionally, we will also send you redlined versions of the Order and Statement of Work by electronic mail.

If you have any questions, please contact Jeff Dhont at (415) 972-3020, or have your attorney contact Taly Jolish, at (415) 972-3925.

Sincerely,

A handwritten signature in black ink, which appears to read "Kathleen Salyer", is written over the typed name.

Kathleen Salyer, Chief  
Site Cleanup Branch

Enclosures

cc: Karl Lytz, Latham & Watkins  
Kelly Richardson, Latham & Watkins  
Paul Sundberg, Consultant to Montrose  
Mike Palmer, Hargis+Associates  
Kim Lesniak, Shell  
John Dudley, URS  
Safouh Sayed, DTSC  
Natasha Raykhman, CH2M Hill